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FOR

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Georgia Power Co., Atlanta, Ga.

Vice-President, M. S. Sloan
The New York Edison Co., New York, N. Y.

Vice-President, W. A. Jones
Henry L. Doherty & Co., New York, N. Y.

Vice-President, J. F. Owens
Oklahoma Gas & Electric Co.,
Oklahoma City, Okla.

Vice-President, Marshall E. Sampsell
Central Illinois Public Service Co.,
Chicago, Ill.

Treasurer, P. S. Young
Public Service Electric & Gas Co.,
Newark, N. J.

Managing Director, Paul S. Clapp
National Electric Light Association,
New York, N. Y.

Secretary, A. Jackson Marshall
National Electric Light Association,
New York, N. Y.

Members-at-Large

(*Term expiring June 30th*, 1929)

H. T. Sands, *Ex Officio*, Electric Bond & Share Co., New York, N. Y.

C. L. Collens, Reliance Electric & Manufacturing Co., Cleveland, Ohio

G. E. Cullinan, Graybar Electric Co., Inc., New York, N. Y.

E. W. Lloyd, Commonwealth Edison Co., Chicago, Ill.

Harry Reid, National Electric Power Co., New York, N. Y.

James R. Strong, Tucker Electrical Construction Co., New York, N. Y.

(*Term expiring June 30th*, 1930)

D. C. Barnes, Stone & Webster, Inc., Boston, Mass.

H. P. Liversidge, The Philadelphia Electric Co., Philadelphia, Pa.

Gerard Swope, General Electric Co., New York, N. Y.

(*Term expiring June 30th*, 1931)

John P. Coghlan, Pacific Gas & Electric Co., San Francisco, Cal.

H. M. Edwards, The New York Edison Co., New York, N. Y.

E. M. Herr, Westinghouse Electric & Manufacturing Co., New York, N. Y.

National Section Chairmen

Accounting—John F. Ford, The Philadelphia Electric Co., Philadelphia, Pa.

Commercial—Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

Engineering—E. C. Stone, Duquesne Light Co., Pittsburgh, Pa.

Public Relations—J. F. Owens, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

Geographic Division Presidents

Canadian—P. S. Gregory, Shawinigan Water & Power Co., Montreal, Canada

Eastern—F. R. Phillips, Duquesne Light Co., Pittsburgh, Pa.

East Central—C. S. MacCalla, Pennsylvania-Ohio Power & Light Co., Youngstown, Ohio

Great Lakes—J. E. Johnson, Illinois Power & Light Corp., Chicago, Ill.

Middle West—Ralph T. Smalley, Kansas Electric Power Co., Lawrence, Kan.

New England—Irwin W. Day, The Connecticut Light & Power Co., Waterbury, Conn.

North Central—L. M. Pharis, Minnesota Power & Light Co., Duluth, Minn.

Northwest—R. M. Boykin, Puget Sound Power & Light Co., Seattle, Wash.

Pacific Coast—Paul M. Downing, Pacific Gas & Electric Co., San Francisco, Cal.

Rocky Mountain—Clare N. Stannard, Public Service Co. of Colorado, Denver, Colo.

Southeastern—C. A. Collier, Georgia Power Co., Atlanta, Ga.

Southwestern—J. G. Holtzclaw, Gulf States Utilities Co., Beaumont, Tex.

Public Policy Committee

Chairman, R. H. Ballard, Southern California Edison Co., Los Angeles, Cal.

Vice-Chairman, W. W. Freeman, Columbia Gas & Electric Corp., New York, N. Y.

P. S. Arkwright, Georgia Power Co., Atlanta, Ga.

Henry G. Bradlee, Stone & Webster, Inc., Boston, Mass.

N. F. Brady, The New York Edison Co., New York, N. Y.

B. C. Cobb, Allied Power & Light Corp., New York, N. Y.

Paul D. Cravath, Westinghouse Electric & Manufacturing Co., New York, N. Y.

Frank L. Dame, The North America Co., New York, N. Y.

J. E. Davidson, Nebraska Power Co., Omaha, Neb.

Henry L. Doherty, Henry L. Doherty & Co., New York, N. Y.

Alex Dow, The Detroit Edison Co., Detroit, Mich.

Charles L. Edgar, The Edison Electric Illuminating Co., Boston, Mass.

Halford Erickson, Byllesby Engineering & Management Corp., Chicago, Ill.

P. G. Gossler, Columbia Gas & Electric Corp., New York, N. Y.

A. R. Graustein, International Paper Co., New York, N. Y.

Franklin T. Griffith, Portland Electric Power Co., Portland, Ore.

C. E. Groesbeck, Electric Bond & Share Co., New York, N. Y.

Edwin Gruhl, The North American Co., New York, N. Y.

A. F. Hockenbeamer, Pacific Gas & Electric Co., San Francisco, Cal.

Martin J. Insull, Middle West Utilities Co., Chicago, Ill.

Samuel Insull, Commonwealth Edison Co., Chicago, Ill.

Walter H. Johnson, The Philadelphia Electric Co., Philadelphia, Pa.

W. A. Jones, Henry L. Doherty & Co., New York, N. Y.

John W. Lieb, The New York Edison Co., New York, N. Y.

Thomas W. Martin, Alabama Power Co., Birmingham, Ala.

Thomas N. McCarter, Public Service Electric & Gas Co., Newark, N. J.

John B. Miller, Southern California Edison Co., Los Angeles, Cal.

Sidney Z. Mitchell, Electric Bond & Share Co., New York, N. Y.

Thomas E. Murray, The New York Edison Co., New York, N. Y.

J. J. O'Brien, H. M. Byllesby & Co., Chicago, Ill.

J. F. Owens, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

R. F. Pack, Northern States Power Co., Minneapolis, Minn.

Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

H. T. Sands, Electric Bond & Share Co., New York, N. Y.

Paul A. Schoellkopf, The Niagara Falls Power Co., Niagara Falls, N. Y.

M. S. Sloan, The New York Edison Co., New York, N. Y.

Frank W. Smith, The United Electric Light & Power Co., New York, N. Y.

R. P. Stevens, Allied Power & Light Corp., New York, N. Y.

Frank M. Tait, The Dayton Power & Light Co., Dayton, Ohio.

A. W. Thompson, The United Gas Improvement Co., Philadelphia, Pa.

George N. Tidd, American Gas & Electric Co., New York, N. Y.

Herbert A. Wagner, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

Owen D. Young, General Electric Co., New York, N. Y.

Public Relations National Section Representatives

John F. Gilchrist, Commonwealth Edison Co., Chicago, Ill.

T. A. Kenney, Allied Power & Light Corp., New York, N. Y.

A. W. Robertson, Philadelphia Co., Pittsburgh, Pa.

Guy W. Talbot, Pacific Power & Light Co., Portland, Ore.

Geographic Divisions State Associations

CANADIAN DIVISION

(*Entire Dominion of Canada*)

Canadian Electrical Association

President, P. S. Gregory, The Shawinigan Water & Power Co., Montreal, Can.; *Secretary*, H. M. Lyster, Room 712, Power Bldg., Montreal, Can.

(*This Division Has No State [Provincial] Section*)

*EASTERN DIVISION

(*New Jersey, New York, Pennsylvania*)

President, F. R. Phillips, Duquesne Light Co., Pittsburgh, Pa.; *Managing Director*, A. B. Millar, Telegraph Bldg., Harrisburg, Pa.

Empire State Gas and Electric Association

President, Charles S. Ruffner, Mohawk-Hudson Power Corp., Albany, N. Y.; *Secretary*, Charles H. B. Chapin, 5618 Grand Central Terminal Bldg., New York, N. Y.

New Jersey Electric Association

President, C. H. Howell, Atlantic City Electric Co., Atlantic City, N. J.; *Secretary*, S. F. Delany, Atlantic City Electric Co., Atlantic City, N. J.

Pennsylvania Electric Association

President, F. R. Phillips, Duquesne Light Co., Pittsburgh, Pa.; *Managing Director*, A. B. Millar, Telegraph Bldg., Harrisburg, Pa.

EAST CENTRAL DIVISION

(*Kentucky, Ohio, West Virginia*)

President, C. S. MacCalla, Pennsylvania-Ohio Power & Light Co., Youngstown, Ohio; *Secretary-Treasurer*, D. L. Gaskill, 603½ Broadway, Greenville, Ohio.

Kentucky Association of Public Utilities

President, Samuel Riddle, Louisville Railway Co., Louisville, Ky.; *Secretary*, E. F. Kelly, Louisville Railway Co., Louisville, Ky.

Public Utilities Association of West Virginia

President, A. C. Spurr, Wheeling Traction Co., Wheeling, W. Va.; *Secretary*, A. Bliss McCrum, Box 1483, Charleston, W. Va.

GREAT LAKES DIVISION

(*Illinois, Indiana, Michigan, Wisconsin*)

President, J. E. Johnson, Illinois Power & Light Corp., Chicago, Ill.; *Secretary*, Tom C. Polk, 910 Marquette Bldg., Chicago, Ill.

Illinois State Electric Association

President, Julius L. Hecht, Public Service Co. of Northern Illinois, Chicago, Ill.; *Secretary-Treasurer*, Tom C. Polk, 910 Marquette Bldg., Chicago, Ill.

Indiana Electric Light Association

President, Norman A. Perry, Indianapolis Power & Light Co., Indianapolis, Ind.; *Secretary-Treasurer*, William Stokes, 1548 Consolidated Bldg., Indianapolis, Ind.

Michigan Electric Light Association Section

President, Howard Pett, Consumers Power Co., Jackson, Mich.; *Secretary-Treasurer*, Herbert Sylvester, The Detroit Edison Co., Ann Arbor, Mich.

Wisconsin Utilities Association

President, C. R. Phenicie, Wisconsin Public Service Corp., Green Bay, Wis.; *Executive Secretary*, John N. Cadby, Room 203, University Bldg., 432 Broadway, Milwaukee, Wis.

*MIDDLE ATLANTIC DIVISION

(*To Consist of Delaware, District of Columbia, Maryland, Virginia*)

Maryland Utilities Association

President, H. T. Connolly, Washington, Baltimore & Annapolis Electric Railroad Company, Baltimore, Md.; *Secretary*, D. E. Kinnear, United Railways & Electric Company, Baltimore, Md.

Public Utilities Association of Virginia

President, A. W. Higgins, Virginia Public Service Co., Charlottesville, Va.; *Secretary*, A. B. Tunis, 301 East Grace Street, Richmond, Va.

MIDDLE WEST DIVISION

(*Iowa, Kansas, Missouri, Nebraska*)

President, Ralph T. Smalley, Kansas Electric Power Co., Lawrence, Kan.; *Managing Director*, Thorne Browne, 1527 Sharp Bldg., Lincoln, Neb.

Iowa Section

President, C. S. Macy, Iowa Power & Light Co., Adel, Iowa; *Secretary-Treasurer*, H. E. Weeks, Tri-City Railway & Light Co., Davenport, Iowa.

Kansas Section

President, Frank M. Stone, Kansas Utilities Co., Fort Scott, Kan.; *Secretary*, H. Lee Jones, Kansas Gas & Electric Co., Wichita, Kan.

Missouri Association of Public Utilities

President, A. E. Reynolds, Springfield Gas & Electric Co., Springfield, Mo.; *Secretary-Treasurer*, F. D. Beardslee, 315 North Twelfth Street, St. Louis, Mo.

Nebraska Section

President, C. W. Amidon, Central Power Co., Grand Island, Neb.; *Managing Director*, Thorne Browne, 1527 Sharp Bldg., Lincoln, Neb.

NEW ENGLAND DIVISION

(*Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont*)

President, Irvin W. Day, The Connecticut Light & Power Co., Waterbury, Conn.; *Secretary*, Miss O. A. Bursiel, Room 1113 Statler Bldg., 20 Providence Street, Boston, Mass.

(*This Division Has No State Sections*)

NORTH CENTRAL DIVISION

(*Minnesota, North Dakota, South Dakota*)

North Central Electric Association

President, L. M. Pharis, Minnesota Power & Light Co., Duluth, Minn.; *Secretary*, John W. Lapham, 803-804 Plymouth Bldg., Minneapolis, Minn.

(*This Division Has No State Sections*)

NORTHWEST DIVISION

(*Alaska, Idaho, Montana, Oregon, Utah, Washington*)

Northwest Electric Light and Power Association

President, R. M. Boykin, Pudget Sound Power & Light Co., Seattle, Wash.; *Secretary*, Berkeley Snow, Room 1206, Spaulding Bldg., Portland, Ore.

(*This Division Has No State Sections*)

PACIFIC COAST DIVISION

(*Arizona, California, Hawaii, Nevada, Philippine Islands*)

Pacific Coast Electrical Association

President, Paul M. Downing, Pacific Gas & Electric Co., San Francisco, Cal.; *Secretary*, Samuel H. Taylor, Suite 729-730, 447 Sutter Street, San Francisco, Cal.

Arizona Utilities Association

President, M. A. Pooler, Tucson Gas, Electric Light & Power Co., Tucson, Ariz.; *Secretary*, L. C. McCullough, 134 South Central Avenue, Phoenix, Ariz.

ROCKY MOUNTAIN DIVISION

(*Colorado, New Mexico, Wyoming*)

President, Clare N. Stannard, Public Service Co. of Colorado, Denver, Colo.; *Secretary*, O. A. Weller, Public Service Co. of Colorado, Denver, Colo.

The Colorado Utilities Association

President, V. L. Board, Public Service Co. of Colo., Denver, Colo.; *Secretary*, O. A. Weller, Public Service Co. of Colo., Denver, Colo.

New Mexico Utilities Association

President, W. W. Nielsen, New Mexico Power Co., Santa Fe, N. M.; *Secretary-Treasurer*, Bernard L. Wiles, Albuquerque Gas & Electric Co., Albuquerque, N. M.

Wyoming Utilities Association

President, W. D. Johnstone, Mountain States Power Co., Casper, Wyo.; *Secretary*, F. A. Probst, Mountain States Telephone & Telegraph Co., Casper, Wyo.

SOUTHEASTERN DIVISION

(*Alabama, Cuba, Florida, Georgia, North Carolina, South Carolina, Tennessee, Porto Rico*)

President, C. A. Collier, Georgia Power Co., Atlanta, Ga.; *Secretary*, C. M. Kilian, 207-8 Bona Allen Bldg., Atlanta, Ga.

SOUTHWESTERN DIVISION

(*Arkansas, Louisiana, Mississippi, Oklahoma, Texas*)

President, J. G. Holtzclaw, Gulf States Utilities Co., Beaumont, Tex.; *Secretary*, S. J. Ballinger, San Antonio Public Service Co., San Antonio, Tex.

Arkansas Utilities Association

President, W. E. Bann, Southwestern Gas & Electric Co., Texarkana, Tex.; *Secretary*, R. I. Brown, Arkansas Central Power Co., Little Rock, Ark.

Mississippi Electric League

President, A. H. Jones, Jones-Johnson Co., McComb, Miss.; *Secretary*, A. R. Riddick, A. G. Riddick, Inc., Jackson, Miss.

Oklahoma Utilities Association

President, L. W. Scherer, United Telephone Corp., Watonga, Okla.; *Secretary*, Edward F. McKay, 1020 Petroleum Bldg., Oklahoma City, Okla.

Southwestern Public Service Association

President, W. H. Burke, Stone & Webster, Inc., Houston, Tex.; *Secretary*, E. N. Willis, 403 Slaughter Bldg., Dallas, Tex.

***Note: This Division is in Process of Formation.**

SECTIONS, BUREAUS and COMMITTEES

Chairmen's names only listed here

SPECIAL NATIONAL COMMITTEES

Advertising Committee—Frank Leroy Blanchard, Henry L. Doherty & Co., New York, N. Y.

Charles A. Coffin Prize Committee—P. S. Arkwright, Georgia Power Co., Atlanta, Ga.

Codes and Standards Committee—Irvin W. Day, The Connecticut Light & Power Co., Waterbury, Conn.

Constitution and By-Laws Committee—R. F. Pack, Northern States Power Co., Minneapolis, Minn.

Electrification of Steam Railroads Committee—Britton I. Budd, Public Service Co. of Northern Illinois, Chicago, Ill.

Exhibition Committee—E. W. Goldschmidt, Wagner Electric Corp., New York, N. Y.

Finance Committee—Sidney Z. Mitchell, Electric Bond & Share Co., New York, N. Y.

Lamp Committee—Frank W. Smith, The United Electric Light & Power Co., New York, N. Y.

Prize Awards Committee—W. H. Onken, Jr., *Electrical World*, New York, N. Y.

Public Policy Committee—R. H. Ballard, Southern California Edison Co., Los Angeles, Cal.

Rate Research Committee—L. R. Nash, Stone & Webster, Inc., Boston, Mass.

Water Power Development Committee—Paul A. Schoellkopf, The Niagara Falls Power Co., Niagara Falls, N. Y.

Wiring Policy Committee—J. E. Davidson, Nebraska Power Co., Omaha, Neb.

GENERAL NATIONAL COMMITTEES

***Civic Development Committee**—John B. Reynolds, Middle West Utilities Co., Chicago, Ill.

***Educational Committee**—Fred R. Jenkins, Commonwealth Edison Co., Chicago, Ill.

***Insurance Committee**—W. H. Sawyer, Allied Power & Light Co., New York, N. Y.

***Membership Committee**—Howard K. Mohr, The Philadelphia Electric Co., Philadelphia, Pa.

***Rural Electric Service Committee**—Charles F. Stuart, Northern States Power Co., Minneapolis, Minn.

ACCOUNTING NATIONAL SECTION

***Section's Executive Committee**—J. F. Ford, The Philadelphia Electric Co., Philadelphia, Pa.

***Classification of Accounts Committee**—H. C. Hasbrouck, H. C. Hopson & Co., New York, N. Y.

Corporate Finance Committee—O. E. McCormick, Middle West Utilities Co., Chicago, Ill.

***Customers' Records Committee** — Douglas Brown, New York & Queens Electric Light & Power Co., Long Island City, N. Y.

***Fixed Capital Committee**—J. A. Rockwood, Portland Electric Power Co., Portland, Ore.

***General Records Committee**—K. B. Crumb, American Gas & Electric Co., New York, N. Y.

***Purchasing and Storeroom Committee**—W. G. Young, New York & Queens Electric Light & Power Co., Long Island City, N. Y.

***Statistics Committee**—Harry A. Snow, The Detroit Edison Co., Detroit, Mich.

COMMERCIAL NATIONAL SECTION

Section's Executive Committee—Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

***Commercial and Industrial Power and Heating Bureau**—V. M. F. Tallman, Charles H. Tenney & Co., Boston, Mass.

Commercial Cooking Committee—O. Wilhelmy, The Union Gas & Electric Co., Cincinnati, Ohio.

Electric Truck Committee—Clyde Farnsworth, Public Service Co. of Colorado, Denver, Colo.

Central Power Committee—H. C. Thuerk, Erie Lighting Co., Erie, Pa.

Industrial Heating Committee—J. L. Faden, The Edison Electric Illuminating Co., Boston, Mass.

***Lighting Bureau**—T. O. Kennedy, The Ohio Public Service Co., Cleveland, Ohio.

Commercial and Industrial Lighting Committee—J. Daniels, The Edison Electric Illuminating Co., Boston, Mass.

Electrical Advertising Committee—C. J. Eaton, Middle West Utilities Co., Chicago, Ill.

Home Lighting Committee—W. T. Blackwell, Public Service Electric & Gas Co., Newark, N. J.

Street Lighting Committee—R. J. Malcomson, Public Service Co. of Northern Illinois, Chicago, Ill.

***Merchandising Bureau**—Frank D. Pembleton, Public Service Electric & Gas Co., Newark, N. J.

Domestic Electric Range Committee—F. A. Coupal, Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.

Merchandise Sales Committee—C. L. Harold, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

Refrigeration Committee—C. L. Dunn, The Ohio Public Service Co., Cleveland, Ohio.

Water Heating Committee—Norman T. Wilcox, Stone & Webster, Inc., Boston, Mass.

***Customer Relations Committee**—H. T. East, Public Service Co. of Northern Illinois, Chicago, Ill.

Promotional Rates Committee—E. W. Lloyd, Commonwealth Edison Co., Chicago, Ill.

***Wiring Sales Committee**—A. P. Good, Commonwealth Edison Co., Chicago, Ill.

ENGINEERING NATIONAL SECTION

***Section's Executive Committee**—E. C. Stone, Duquesne Light Co., Pittsburgh, Pa.

***Accident Prevention Committee**—C. R. Beardsley, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

***Electrical Apparatus Committee**—J. A. Johnson, The Niagara Falls Power Co., Niagara Falls, N. Y.

Engineering Administration Committee—H. P. Liversidge, The Philadelphia Electric Co., Philadelphia, Pa.

***Hydraulic Power Committee**—Byron E. White, Utica Gas & Electric Co., Utica, N. Y.

***Inductive Coordination Committee**—H. L. Wills, Georgia Power Co., Atlanta, Ga.

***Meter Committee**—E. E. Hill, The New York Edison Co., New York, N. Y.

***Overhead Systems Committee**—Harold Cole, The Detroit Edison Co., Detroit, Mich.

***Power System Engineering Committee**—L. W. W. Morrow, *Electrical World*, New York, N. Y.

***Prime Movers Committee**—E. B. Ricketts, The New York Edison Co., New York, N. Y.

Special Engineering Research Committee—C. F. Hirshfeld, The Detroit Edison Co, Detroit, Mich.

***Underground Systems Committee**—J. W. Sylvester, The Philadelphia Electric Co., Philadelphia, Pa.

PUBLIC RELATIONS NATIONAL SECTION

***Section's Executive Committee**—J. F. OWENS, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

***Cooperation with Educational Institutions**—CARL D. JACKSON, 36 West 44th Street, New York, N. Y.

***Customer Ownership**—W. H. HODGE, Byllesby Engineering & Management Corp., Chicago, Ill.

***Industrial Relations Committee**—HOMER E. NIESZ, Commonwealth Edison Co., Chicago, Ill.

***Information Bureau Organizations Committee**—T. A. KENNEY, Allied Power & Light Corp., New York, N. Y.

Manufacturers' Advertising Committee—T. J. McMANIS, General Electric Co., Schenectady, N. Y.

***Public Speaking Committee**—W. S. VIVIAN, Middle West Utilities Co., Chicago, Ill.

***Relations with Financial Institutions Committee**—A. W. ROBERTSON, Philadelphia Co., Pittsburgh, Pa.

***Women's Committee**—MISS SOPHIA MALICKI, Middle West Utilities Co., Chicago, Ill.

***Provision is made for a representative from each Geographic Division.**

CONVENTIONS and MEETINGS

Meeting of the Section, Bureaus and Committees of the National Electric Light Association are shown in roman type; those of other associations in italics

1929

January

1–2 *American Association for the Advancement of Science, New York, N. Y.*

3 Corporate Finance Committee, 10.00 a. m., N. E. L. A. Headquarters, New York, N. Y.

7–9 *Midwinter Conference of Secretary Managers of Electrical Leagues, Cleveland, Ohio.*

9 *New York Electrical Society, New York, N. Y.*

10 Lighting Bureau, Commercial National Section, Hollenden Hotel, Cleveland, Ohio.

10–11 Electric Section, Empire State Gas and Electric Association, Engineering Societies Building, New York, N. Y.

14 *American Institute of Consulting Engineers, New York, N. Y.*

14–15 *American Engineering Council, Washington, D. C.*

14–18 *American Society of Steel Treating, Los Angeles, Cal.*

15–16 Kentucky Association of Public Utilities, Brown Hotel, Louisville, Ky.

15–18 *Society of Automotive Engineers, Detroit, Mich.*

18 *American Washing Machine Manufacturers Association, Drake Hotel, Chicago, Ill.*

21–26 *National Electrical Manufacturers Association, Supply Division, Hotel Commodore, New York, N. Y.*

21–22 Engineering Section, North Central Geographic Division, Minneapolis, Minn.

21–22 Overhead Systems Committee, William Penn Hotel, Pittsburgh, Pa.

24–25 Underground Systems Committee, William Penn Hotel, Pittsburgh, Pa.

25 Commercial Section, Great Lakes Geographic Division, Pfister Hotel, Milwaukee, Wis.

28–29 Rural Electric Service Conference, North Central Geographic Division, Nicollet Hotel, Minneapolis, Minn.

28–31 *American Institute of Electrical Engineers, New York, N. Y.*

February

1 *American Institute of Electrical Engineers, New York, N. Y.*

5–7 *Artictic Lighting Equipment Association, Cavalier Hotel, Virginia Beach, Va.*

6 *New York Electrical Society, New York, N. Y.*

6–8 *Iowa Engineering Society, Des Moines, Iowa.*

12–16 *Midwest Power Conference and Exhibition, Chicago, Ill.*

18–20 New Mexico Utilities Association, Franciscan Hotel, Albuquerque, N. M.

18–21 *American Institute of Mining and Metallurgical Engineers, New York, N. Y.*

20–27 *Own Your Home Exposition, Madison Square Garden, New York, N. Y.*

25–26 Accounting National Section, Group Committee meetings, Palmer House, Chicago, Ill.

25–26 Commercial Section, North Central Geographic Division, Nicollet Hotel, Minneapolis, Minn.

March

4–6 *American Railway Association, Division 4, Engineering Signal Section, Stevens Hotel, Chicago, Ill.*

6 *New York Electrical Society, New York, N. Y.*

8 *Board of Directors, Society for Electrical Development, New York, N. Y.*

11–14 Group Committee Meetings, Engineering National Section, Peabody Hotel, Memphis, Tenn.

12–14 Oklahoma Utilities Association, Oklahoma City, Okla.

20–22 *American Institute of Electrical Engineers, Regional Meeting, Cincinnati, Ohio.*

21–23 *American Society of Mechanical Engineers, Knoxville, Tenn.*

April

3 *New York Electrical Society, New York, N. Y.*

4–13 *Home Complete Exposition, Indiana State Fair Grounds, Indianapolis, Ind.*

17–18 *National Warm Air Heating and Ventilating Association, Indianapolis, Ind.*

21–23 *American Society of Civil Engineers, Dallas, Texas.*

22–26 *American Welding Society, Engineering Societies Bldg., New York, N. Y.*

24–26 Middle West Geographic Division, Hotel Fontenelle, Omaha, Neb.

29–30 *Chamber of Commerce of the U. S. A., Washington, D. C.*

30 Southwestern Geographic Division, Hot Springs, Ark.

30 Arkansas Utilities Association, Hot Springs, Ark.

May

1–3—Southwestern Geographic Division, Hot Springs, Ark.

1–3 Arkansas Utilities Association, Hot Springs, Ark.

1–3 *Chamber of Commerce of the U. S. A., Washington, D. C.*

7–9 *American Institute of Electrical Engineers, Regional Meeting, Dallas, Texas.*

7–10 East Central Geographic Division, Brown Hotel, Louisville, Ky.

8–10 Southeastern Geographic Division, Asheville, N. C.

13–15 *American Society of Mechanical Engineers, Rochester, N. Y.*

13–16 *National Fire Protection Association, Memphis, Tenn.*

27–31 *National Electrical Wholesalers Association, The Homestead, Hot Springs, Va.*

27–31 *General Federation of Women's Clubs, Swampscott, Mass.*

June

3–7 Annual Convention and Exhibition, NATIONAL ELECTRIC LIGHT ASSOCIATION, Municipal Auditorium, Atlantic City, N. J.

14 *Board of Directors, Society for Electrical Development, New York, N. Y.*

16–18 North Central Geographic Division, Breezy Point Summer Resort, Pequot, Minn.

18–21 *Society of Automotive Engineers, New York, N. Y.*

19–21 Canadian Geographic Division, Algonquin Hotel, St. Andrews-by-the-Sea, N. B.

19–22 Pacific Coast Geographic Division, Del Monte, Cal.

24–28 *American Society for Testing Material, Atlantic City, N. J.*

24–28 *American Institute of Electrical Engineers, Swampscott, Mass.*

July

1–4 *American Society of Mechanical Engineers, Salt Lake City, Utah*

August

27–30 *National Association of Railroad and Utilities Commissioners, Glacier National Park Hotel, Glacier National Park, Mont.*

September

4–6 Pennsylvania Electric Association, Bedford Springs Hotel, Bedford Springs, Pa.

9–11 Rocky Mountain Geographic Division (*Place not yet determined*)

October

14–18 *American Gas Association, Atlantic City, N. J.*

NEW MEMBERS

Electric Light & Power Companies (Class A)

- *Illinois, Chicago,* National Public Utilities Company
- *Indiana, Marengo,* General Utilities Company
- *Canada, Quebec,* Canton, Chambly, Chambly Power Corporation

Employees of Electric Light & Power Companies (Class B)

- *Alabama, Birmingham,* Birmingham Electric Company
    - C. R. Causey
- *California, Riverside,* The Southern Sierras Power Company
    - Edwin P. Pennebaker (El Centro)
- *California, San Francisco,* Great Western Power Company
    - F. W. McGuire
- *Massachusetts, Boston,* The Edison Electric Illuminating Co. of Boston
    - Dwight Bradford Hill
    - William F. Rooney
- *Massachusetts, Lowell,* The Lowell Electric Light Corporation
    - J. L. Scadding
- *Massachusetts, New Bedford,* New Bedford Gas & Edison Light Company
    - Mrs. Fannie M. Allen
- *Massachusetts, North Adams,* North Adams Gas Light Company
    - Fred A. Windover
- *New Jersey, Newark,* Public Service Electric & Gas Company
    - T. A. Eldridge (Metuchen, N. J.)
    - Howard E. Hebble (East Orange, N. J.)
    - Adolph Kuenzler (Metuchen, N. J.)
    - Ralph E. McLaughlin (Jersey City, N. J.)
    - William McNamara (Jersey City, N. J.)
    - Lewis Arthur Pifer (Irvington, N. J.)
    - Frederick J. Schaedler (Jersey City, N. J.)
    - Shabady Shaheen (Metuchen, N. J.)
    - F. H. Stillick (Metuchen, N. J.)
    - Frederick J. Trost (Belleville, N. J.)
    - F. Herbert Weldon (Jersey City, N. J.)
- *New York, Albany,* New York Power & Light Corporation
    - Chas. M. Hill
    - Herbert Lasher
- *New York, Mount Vernon,* Westchester Lighting Company
    - Robert E. Dean
    - L. D. Hatch (New York, N. Y.)
    - Irwin M. Huebsch
    - Francis J. O'Leary (Yonkers, N. Y.)
    - R. L. Petersen (Yonkers, N. Y.)
    - Emil A. Schryber (Mamaroneck, N. Y.)
- *New York, New York,* Bronx Gas & Electric Company
    - Otto H. Feulner
    - L. E. Fitzgibbon
    - Alfred E. O'Neill
- *New York, New York,* The New York Edison Company
    - George H. Arapakis
    - J. J. Formanek (Corona, Long Island, N. Y.)
    - Miss Emeline M. Kavin (Brooklyn, N. Y.)
    - Paul B. Smith (Brooklyn, N. Y.)
- *New York, New York,* The New York Edison Company
    - Jerome J. Walters
    - B. F. Wills (Brooklyn, N. Y.)
    - Walter E. Zeun
- *New York, New York.* The United Electric Light & Power Company
    - Lung C. Chin
    - Philip Josslon
    - Salvatore J. Scala
- *New York, Far Rockaway,* Queens Borough Gas & Electric Company
    - Henry F. Wagner
- *New York, Long Island City,* New York & Queens Electric Light & Power Co
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    - Miss Elena H. Fogal (Jamaica, N. Y.)
    - Harold A. Nelson (Jamaica, N. Y.)
    - Miss Mae A. Waters (Woodside, N. Y.)
    - Miss Emily Willing (Woodside, N. Y.)
- *New York, Poughkeepsie,* Central Hudson Gas & Electric Corporation
    - E. E. Althouse
- *Ohio, Greenville,* Greenville Electric Light & Power Company
    - Harry L. Milligan

(*Continued on page 32*)

PARTIAL LIST OF N. E. L. A. COMMITTEE REPORTS

ENGINEERING NATIONAL SECTION

Prime Movers Committee—1927-1928

		Price	To Members
278-48	Specifications	.40	.25
278-49	Stokers and Furnaces	1.00	.65
278-53	Higher Steam Pressure and temperatures	.60	.40
278-65	Boilers, Superheaters and Economizers	1.00	.65
278-77	Foreign Developments	.40	.25
278-78	Condensing Equipment	.75	.50
278-80	Distillation Products of Coal	.40	.25
278-81	Treatment of Feed Water	.90	.60
278-84	Station Piping	.25	.15
278-85	Pulverized Fuel	1.50	1.00
278-101	Power Station Betterment	.60	.40

1926-1927

		Price	To Members
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267-17	Coal & Ash Handling	.25	.15
267-24	Oil and Gas Engines	.30	.20
267-42	Boiler and Turbine Room Instruments	.40	.25
267-78	Turbines	.90	.60

Overhead Systems Committee—1928-1929

		Price	To Members
289-6	Practical Uses of Steel and Concrete Poles	.40	.25

1927-1928

		Price	To Members
278-3	Service Tests of Treated and Untreated Poles	.15	.10
278-17	Mechanical and Electrical Properties of Conductors for 220-kv. Lines	.55	.35

Meter Committee—1928-1929

		Price	To Members
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1927-1928

		Price	To Members
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278-23	Auditing Meter Records	.15	.10
278-27	Educational Opportunities for the Meterman	.15	.10
278-31	Methods of Determining Correctness of Watthour Meter Connections	.90	.60
278-40	A Method for Determining the Condition of Current Transformers While in Service	.15	.10
278-43	Totalizing the Output of Two or More A. C. Circuits on One Watthour Meter	.30	.20
278-95	3-Phase, 4-Wire and 2-Phase, 5-Wire Metering	.25	.15

1926-1927

		Price	To Members
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267-50	Changes in Watt-Hour Meter Terminal Chambers and Connections	.15	.10
267-53	Metering Three-Phase, Four-Wire, Secondary Network Systems (Under 600 Volts)	.15	.10
267-54	Metering Interchange of Power at High Voltages	.15	.10
267-92	Auxiliary Testing Apparatus	.45	.30

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278-102	Inspection and Testing of Cable	.25	.15
278-106	Conduit and Manhole Construction	.25	.15
278-107	Cable Joint Design and Construction	.40	.25

1926-1927

		Price	To Members
267-25	Suggested Specifications for Lead Covered Underground Cable Insulated with Impregnated Paper	.40	.25
267-32	Conduit and Manhole Temperatures	.40	.25
267-48	Cable Installation	.40	.25

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278-76	Mechanical Reliability of Hydro-Electric Units—1926	.25	.15
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1926-1927

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267-44	Packing for Hydraulic Machines	.25	.15
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		Price	To Members
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1926-1927

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1926-1927

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1927-1928

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1926-1927

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NATIONAL ELECTRIC LIGHT ASSOCIATION

420 Lexington Ave., New York, N. Y.

THE PRESIDENT'S PAGE

FROM the standpoint of material things, as well as that of morale, no year has ever been better for the electrical industry than the one just passed.

While, during the year, it has borne the brunt of the assault of those who would nationalize the country's industries, businesses and professions, it is worth emphasizing that: utility securities have a preferred place in the market—what better test of the public's confidence; the great majority of reputable newspapers, journals and individual leaders of thought who believe in fair play, have protested against the unfair and often scurrilous attacks made upon the industry; we have a firm conviction that we are successfully doing our job—furnishing service to our customers at fair rates, and safeguarding the interests of the millions of people, banks, trusts, insurance companies that have invested in our securities; we feel that we are doing our part in helping to make this country the finest in the world.

During 1928 the production of electricity by all agencies which contribute to the public supply, according to preliminary estimates, was approximately 88,000,000,000 kilowatt-hours, in addition to which another 1,600,000,000 kilowatt-hours was imported from Canada. This total available supply was as much as the production of all the rest of the world. During the past seven years, the industry has added more than 13,500,000 kilowatts to generating capacity; it has constructed nearly 50,000 miles of high voltage transmission lines; doubled the output of its energy and increased the number of its customers by more than 10,000,000.

Approximately 1,400,000 new customers were added during 1928, making a total of 23,000,000 now served by this industry. Of these, nearly 19,000,000 are household users, indicating the rapid increase in the diffusion of electric service to the homes of the nation. Twenty-five years ago, the total number of all consumers was 650,000. Electric service has now been extended to every city with a population of 5,000 and over; to 97% of all communities with populations between 1,000 and 5,000; to 50% of all communities between 250 and 1000; and to more than 25% of all hamlets of less than 250 population.

There is satisfaction in viewing our 1928 accomplishments, and we look forward to 1929 with confidence.

P S Arkwright

President.

N·E·L·A·
BULLETIN

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Information relating to the N. E. L. A. BULLETIN will be found on inside page of front cover.

In Its 21st Year

"A NEW departure of the National Electric Light Association in the issue of this BULLETIN is undertaken in the hope of accomplishing several objects simultaneously. . . .

"With the columns of this little publication open to committees, or to individual members having matters of interest to the membership at large, there should be ample opportunity for the dissemination of useful information among members." *From Vol. I, No.* 1, *N. E. L. A.* BULLETIN, *August,* 1907.

* * * *

"Our readers cannot fail to note that this month the BULLETIN comes out in a new dress. We hope and believe it will be regarded as a handsomer dress. Change is sometimes worth while, as change, for its own sake—'For God fulfills himself in many ways, Lest one good custom should corrupt the world.' In the present instance, the BULLETIN which has always been of an odd size, from the printing standpoint, is brought in line with the conventional magazine sizes of the day. As already stated . . . it is proposed to throw more emphasis on the BULLETIN as a part of association work, and to increase its usefulness. Beginning a few years ago as a very modest little fly-sheet, it is even now a magazine of respectable proportions, and each year proves itself to be more and more helpful as an Association agency for information and education." *From Vol. VI, No.* 1, *N. E. L. A.* BULLETIN, *September,* 1912.

"The change in . . . form and contents of the old BULLETIN is another departure from the old way of things. We do not feel that in its old form it was playing a big and active enough part in the life of the Association. The contents perhaps were a little too dry . . . We intend to lighten things up a bit and put "pep" into the magazine.

"The BULLETIN in the past has been adequately representative of the physical material, and mechanical life of the association, but it has not been quite so able in expressing what we might call the N. E. L. A. spirit. This is a spirit of good fellowship, enthusiasm and progress. This is the spirit we are going to make the magazine radiate from every page. Starting with this number, we are going to make the old BULLETIN a new BULLETIN, alive, progressive, and more representative of our great Association. We need your cooperation." *From Vol. VII (new series), No.* 1, *N. E. L. A.* BULLETIN, *January,* 1920.

* * * *

Old readers will perceive that the N. E. L. A. BULLETIN again comes out in new format. It is hoped that it will be liked. Its policy will remain — *"To advance the art and science of the production, distribution and use of electrical energy for public service."*

A Leap Before Looking

THE decision of the Interstate Commerce Commission to refrain from compelling railroads to make further installations of automatic train control devices or block signals, as announced on Nov. 28, is of interest to everyone. After three years the commission has apparently decided that the results obtained are too small in comparison with the investment required. This is an example of the manner in which a Federal Government Bureau may plunge an industry into an expenditure of tens of millions of dollars without having made sufficient inquiry into the question as to whether this expenditure will bring commensurate results.

On June 30, 1920, the commission ordered forty-nine railroads to install automatic train control by Jan. 1, 1925. On Jan. 14, 1924, it issued a second order adding forty-five railroads to this list. In reply to a petition for rehearing, the commission said: "The fifteen years of investigation and study and the results obtained in the actual influence of these devices over a period of years upon some of the railroads, have clearly demonstrated the practicability of, and the necessity for automatic train stop or train control. The time has now arrived when the carriers should be required to select and install such devices as will meet our specifications and requirements."

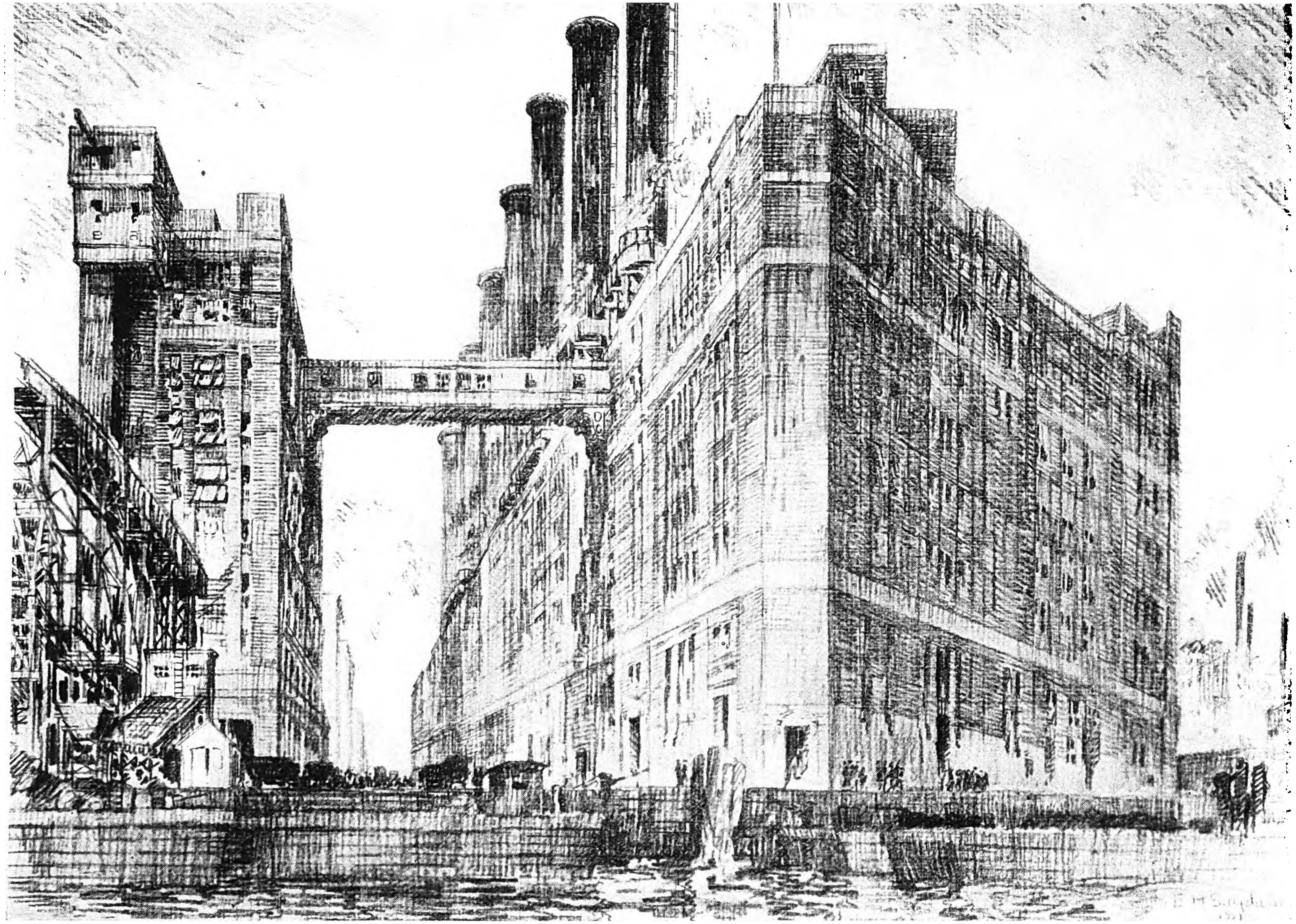
Since that time the safety devices called for by these orders have been installed on 11,238 miles of road with 19,752 miles of traffic and 8361 locomotives, at a cost of approximately 26½ million dollars, according to a statement issued by the National Association of Railroad and Utilities Commissioners dated, Nov. 30, 1928. Now the commission decides that: "The number of accidents and casualties which resulted from disregard of signal indications, is relatively small in comparison with those which resulted from other causes."

For this reason it has concluded: "not to require by order at the present time further installations of train stop or train control devices." It takes occasion at this time, to admonish the railroads to be: "diligent in their efforts to provide adequate protection against accidents due to grade crossings, derailments, collisions in territory not protected by block signals, failure of wooden bridges, and trestles and the use of wooden passenger train cars which have been repeatedly mentioned in our recommendations to Congress."

Apparently the commission is discouraged over the net results of the installation of automatic train control devices, for it says: "There is no evidence of the actual prevention of accidents by the intervention of the automatic device and in the nature of things, little affirmative evidence can be expected."

This matter is of interest to industry, because some of the early devices were susceptible to interference from light and power systems and from electrically operated machinery in factories adjacent to railroad rights of way, and often resulted in occasional faulty signal indications. A considerable amount of trouble and expense has devolved upon the National Electric Light Association and individual power companies in connection with a study of the subject, which, through cooperation with the railroads, has resulted from time to time in the adoption of other systems which are immune to foreign current interferences.

The significance of the situation, is that such large expenditures for no purpose, ultimately must be reflected in the cost of service to the consumer.



Architect, Thomas E. Murray, Inc.

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The East River Station of The New York Edison Company

N·E·L·A·
BULLETIN

January, 1929

Vol. XVI No. 1

The Spirit of Shakespeare in Physical Research

By OWEN D. YOUNG

ON June 1, 1889, I received my first diploma. It was granted by the Board of Regents of the University of the State of New York. It certified that I was to be accepted by the world as an academic graduate. Last night I received from you the honorary degree of Doctor of Laws, a much rarer but not more highly prized distinction. The first came when I was fourteen years old—the last at fifty-four. What honor, however great, can compete with the joy of taking home your first diploma? Now I thank you for them both. They mark a span of forty years, and together they constitute my most prized possession.

Much has happened during that forty years. In a sense we have moved from an old world to a new, not only in the things we have, but in the way we think and the kind of things we talk about.

In 1889, at the time of my first diploma, I was thrilled by an oration, great of its time and kind. In the peroration, the speaker told us how on one quiet moonlight night he had taken a canoe and gone out on one of the great bays of Lake Superior beyond the sight of land. There was no movement of the air or water, nothing but the arch of the sky above and its reflection below—a perfect sphere at the center of which was an individual man alone.

In a recent lecture before the British Association at Oxford, Dr. Arthur S. Eddington, professor of Astronomy at the University of Cambridge, said:

The Chairman of the Board of the General Electric Company, Co-author of the Dawes Plan, and Citizen Extraordinary of the United States, needs no introduction to the readers of the N. E. L. A. BULLETIN. *This address was given at the 64th Convocation of the University of the State of New York on Oct. 19th, when Mr. Young was awarded the honorary degree of Doctor of Laws. It is believed that, aside from other considerations, it is of particular timeliness because of the great interest being manifested in pure science research, which has resulted in the creation of the National Research Fund to which the electrical industry, through the National Electric Light Association, has subscribed.*

"Nearly midway in scale between the atom and the star there is another structure no less marvelous — the human body. Man is slightly nearer to the atom than to the star. About 10^{27} atoms build his body; about 10^{28} human bodies constitute enough material to build a star.

"From his central position man can survey the grandest works of Nature with the astronomer, or the minutest works with the physicist. Tonight I ask you to look both ways. For the road to a knowledge of the stars leads through the atom; and important knowledge of the atom has been reached through the stars."

In both cases the individual man is at the center of the sphere, but how different the spirit of approach. I believe it characteristic of the two periods.

Ten raised to the twenty-seventh power measuring the number of atoms in the human body is just as much an appeal to the imagination as the perfect sphere on Lake Superior. But it is something more too, and it is that something which is suggested by the term research today. It reflects the intellectual bent of our time. It combines the imagination of William Shakespeare with the flair for knowledge of Francis Bacon. And so, Mr. President, with your permission, I should like to draw attention to two periods which have much in common, and which, to my mind, are the most productive of any in our history. They are three hundred years apart, the one from 1575 to 1650, and the other from 1875 to 1950; the latter, fortunately, with twenty-two years yet to go.

There seem to be periods when the imagination of men flowers in production. It appears to be stimulated by a demand for new things. Curiously enough, it has a relation to business and to profits. It matters not whether one speaks of Sir Walter Raleigh or Sir Francis Drake or William Shakespeare or Thomas A. Edison. The imagination is harnessed to a very prosaic need, and that, to my mind, is the distinctive characteristics of the periods of which I speak. Perhaps it is not so far away from the subject assigned to me, which is the contribution of research to industry. My point is that the human intellect functions best when it is hitched more or less closely to practical service, and conversely very ordinary jobs, such as navigation and the production of goods, take on a new aspect when there is cast over them the glow of the highest qualities of the humand mind. The intellectual activity of the schoolmen in the middle ages was an interesting pastime, but it could scarcely have brought a greater thrill or more satisfaction than the solution of a crossword puzzle does to day. So, too, the navigation of a slave ship was a very different thing from that of the little fleet which carried Columbus westward or Sir Francis Drake on his momentous voyage, or Commander Byrd on his present adventure. The combination of the imaginative qualities of the human intellect with the matter of fact production of goods or performance of service is an inspiration to both. This combination existed in the time of Elizabeth, just as it does today. It may account in some measure for the great things which happened then, just as I believe it accounts for the things which happen now. Let us take a look at the conditions of the two periods and see how much they have in common.

Action Everywhere

Since 1875 our population has almost doubled, urban growth has trebled, and the wealth and prosperity of the people have enormously increased. New industries have sprung up, science and invention have provided new things and afforded new ways of spending unexpected wealth. The quiet of a generation ago has been succeeded by great restlessness. Everywhere there is activity both in mind and body. Young men and women have flocked into our schools and colleges. They have called up in critical review, not only the fashions and customs of their fathers and mothers, but their very habits of thought. They refuse the old strait-jacket, and we call them unconventional and daring. Good—they reflect the spirit of the age. Everywhere there is action, and not only action but speed. We race over our roads—we fly through the air—we talk across continents—we throw the energy of Niagara hundreds of miles to the points where we need it, and all these activities require daring and skill and nervous tension. It is life, not in repose, but in action.

Changes in Elizabethan Times

So it was in the time of Elizabeth. Great companies were organized to reach world markets. The Armada was swept from the seas, Spanish influence in the western hemisphere was curbed, and England became a world power. Its population doubled and that of London trebled in a brief period. Young men were lured from the farms to the cities. Wealth increased rapidly, and with it the independence of the merchant classes. In the words of a contemporary observer: "This sort of people — commonlie live wealthilie, keepe good houses and travell to get riches—with grasing frequenting of markets and keeping of servants they do come to great welth, in so much that manie of them are able and doo buie the lands of unthriftie gentlemen, and often setting their sonnes to the schools, the universities, and to the Inns of the Court."

New things were demanded and provided. Chimneys were invented, and tobacco, potatoes and forks came into common use.

Riding in coaches became such a pastime as to threaten the business of the boatmen on the Thames. Luxury and extravagance reached such a height that a sumptuary proclamation referred to the "immeasurable charges and expenses" which certain classes "of better sorte" were put to "in superfluous apparelling their wives, children and families, the confusion also of degrees in all places being great, where the meanest are as richly apparelled as their betters, and the pride that such inferiour persons take in their garments, drawing many for their maintenance to robbing and stealing by the hiewaye."

The monasteries were closed and the authority of the church weakened. Preachers complained bitterly of the decay of morality, and learning at the universities reached a low ebb. By what grace, they inquired, just as we are inquiring today, would the generation be saved?

We can look back and see the answer.

"Merrie" England Awakened

This "merrie England" had awakened from a long sleep and found itself in a new world. The explorers and adventurers had discovered new continents and strange people in the far off seas. There was wealth untold for him that would journey there. Men were in a receptive and appreciative state of mind, their curiosity was aroused, their intellects were hungry. Everywhere were imagination and action.

Printing had been invented. Few could read, but everyone could understand, and so in the theatres and from the musical tongues of actors they could hear about the old English kings, about gods and goddesses, about Julius Caesar and Cleopatra, about the merchants of Venice, and about the strange things in far off lands. Never before had there been in England so much to talk about.

What wonder then that professional talkers and writers sprang up everywhere as numerous as berries on a bush. It was not necessary to import foreign talent to establish the commercial means to meet this demand and the theatre and dramatic industry, as it was indigenous, also became one of the most flourishing, comparable to the movie industry today in the number of theatres and crowds in attendance.

What an opportunity for money making, and the illiterate pawn broker Henslow, supplied with the necessary technical knowledge by the marriage of his daughter to the actor Alleyn, establishes a play factory where experts in plot-making and acting, specialists in tragical discourse, puns and merry jokes are in demand. His plant turns out on an average one play every two weeks, and he manages to keep his actors in subservience and his poets in constant need by the simple expedient of lending them money and never allowing their debts to be fully paid off. Go to Henslow's if you want a job at writing or acting, an old wig, a costume or a play; and if the play is merely an old one that has been pilfered, rewritten and renamed, that is your lookout. In any event, Henslow is growing rich and London is being amused.

But there is a young fellow come up

from Stratford who will bear watching. He is only holding horses now for Heming and the Burbages at the Globe, or perhaps he is an apprentice, but he is a likeable chap, clever, and sees everything, and by the time that seven years have elapsed your staff may be complaining that this Johannes factotum, this young upstart, plumed with their feathers, claims that he is able to bombast out a line as well as the best of them. They have booted his company with its "baggage books" out of the Oxford grounds, but he thinks he can show the University fellows a trick or two. Besides, they say he is ambitious and thrifty and has set his cap on making a fortune, getting a coat of arms for his family and rubbing elbows with the nobilty.

The first thing we know he will be going back to Stratford, buying the biggest place in town and with a twinkle in his eye letting the town fathers see that he wasn't such a good for nothing after all, and had in fact done better than anyone else what everybody said he couldn't do at all.

Shakespeare's day came, and taking into account the other great movements of the period, it may seem not a little strange that now it is for him and others like him that the Tudor reigns are chiefly remembered. Today Elizabethan literature quite overshadows our interest in the commercial expansion, the religious controversies, the political intrigue, of the period.

Contemporary Estimate Different

Yet the contemporary estimate was far different. Writing for the theatres was not practicing the art of letters. Dramatic composition in Latin and Greek for performance at the University was noble and worth while, but plays written in the vernacular and for the amusement of the rabble, were tainted with commercialism and of no permanent value. From the standpoint of the universities and "cultured" classes, the dramatists were only artisans and tradesmen, fashioning and vending their wares in accordance with public demand. "God forbid," exclaims Daniel, "I should my paper blot with mercenary lines. No, no, my verse respects not Thames nor theatres."

But Shakespeare and his contemporaries were supplying their active age with the things it wanted, and the universities might frown on the commercial playwrights. The devotees to old customs might lament the new ways, but in spite of all, the greatest imaginative intellects of the race were functioning in response to real demand.

Shakespeare had drawn revenue as co-proprietor of the Globe, as actor, and as poet to the extent of $3,000 a year, and then returned to his mansion at Stratford with a comfortable estate of some $50,000. He had been associated with men in the same business who had grown rich in catering to the public taste. Pope may have been far from jesting when he declared that Shakespeare

"For gain, not glory, winged his roving flight,
And grew immortal in his own despite."

The criticism sounds strangely familiar to modern ears.

Perhaps Charles Darwin was the Chaucer of our time. It may be that Faraday and Joseph Henry had their counterparts in the earlier day in another field. But broadly speaking, it is true that with occasional exceptions the human mind had lain fallow in the field of practical achievement until 1875, just as it had in the field of language and literature before 1575. And then what a burst of glory. * * * —the intellect of man blossoms again and makes amazing contributions to human welfare.

Just as the voyages of Vasco Da Gama and Columbus and Magellan, by disclosing a new world, played havoc with traditional beliefs, created a demand for an explanation and an interpretation and produced the great poets of the Elizabethan period, so the discoveries of Dalton and Prout and Crookes and Roentgen during the second half of the nineteenth century disclosed another and even more marvellous universe within the atom, for an explanation of which we look to the physical scientist of today.

The glories of the sun, the moon and the stars, the wonders of nature, have always been a theme for poets and philosophers. Since the days of Democritus and Lucretius the granular structure of matter had been discussed, and speculation even reached the point where all matter was conceived of as compounded of the hydrogen atom. But thought had gone no further when many of us received our diplomas and were sent out into the world to show the benighted what education could do for a man.

Soon, however, from continued experiments on electrical discharges in rarified gases and especially from a close study of the so-called cathode rays, scientists were led to recognize the existence of the electrons, small negatively charged particles of which all matter was composed, each 2000 times as small as this same hydrogen atom.

There are about two billion inhabitants on the globe. If every man, woman and child had five hundred billion dollars and each dollar represented an atom, their total wealth would still fall short of the number of atoms found in a drop of water. It contains so many that if the entire earth, both land and sea, were covered with a velvet lawn, and each blade of grass represented ten thousand atoms, the little elf of science could collect them all in a basket the size of a raindrop.

Is this imagination? To the physical scientist not at all. These things have been weighed and counted. Radium, x-rays and radio bear witness to their reality. But what *is* this atom; what are these electrons, parts of itself that it shoots forth at the speed of light? Here we are definitely in the field of speculation and fancy, and hardly a year passes that does not see the entrance as well as the exit of a Thompson, a Rutheford, a Langmuir, a Bohr, or a Shroedinger form of atom. The electrons are in concentric spheres about a central proton, they stand still, they move at the rate of one hundred thousand miles a second, they travel in orbits, they are like planets moving about a central sun, they are but a vibrating mass of ether. The space relative to their size for their accommodation within the atom, itself infinitesimally small, is no less ample than the solar system itself.

From Small to Great

In his attempt to unify physical nature, the physicist turns from the infinitely small to the incomprehensibly great. Like the true poet that he is, he lets his eye glance

"from heaven to earth, from earth to heaven;
And, as imagination bodies forth
The forms of things unknown, the poet's pen
Turns them to shapes, and gives to airy nothing
A local habitation and a name" . . .

Light travels at the rate of 186,000 miles a second, and the distance that it travels in a year is some five thousand billion miles. Using this light year as his yard stick, the astrophysicist finds the nearest star twenty thousand million miles away; finds that the largest would accommodate the entire orbit of the earth with millions of miles beyond Neptune to spare; finds the smallest about the size of the earth, with matter weighing about a ton per cubic inch.

These blazing orbs with temperature of forty million degrees are the furnaces in which he sets his crucibles. They number four billion, yet are so far apart that they are in no more danger of colliding than thirty baseballs roaming the whole interior of the earth. Their characteristics "depend on the simplest and most fundamental laws of nature, and even with our present knowledge might have been predicted from general physical principles if we had never seen a star." "So detailed an interpretation of the properties of the greatest bodies known in nature, directly from the properties of the smallest, constitutes," as has been truly said, "one of the most notable triumphs of modern physical science," and, I may add, of the human imagination.

What Lies Ahead?

Only a few of the paths to truth have yet been traversed, and who can predict what the future may have in store. For observe that with all our investigations and inquiries we are not creating anything. We are only finding out what already exists—facts of which mankind must take account if it is to survive.

Does nature wait until she is found out before she exacts her penalties or bestows her blessings? Not at all. In the reign of the Tudors about a quarter to a sixth of the population of London was wiped out every generation and in a single season by epidemics and disease, and in Shakespeare's day the death rate determined whether the theatres should be opened or closed. Today, thanks to research, such plagues are almost unknown. For millions of years the sun has delivered her life giving rays at the rate of 4,690,000 horse power per square mile, worth at current rates upward of two billion dollars a year. Now physical research has disclosed yet other rays coming from space with a wave length one hundred millionth that of light and five thousandths that of X-rays, the shortest heretofore known. What effect these may be producing on us as we gather here, or on the material substance in the walls of this edifice itself is at present unknown. They may be keeping us alive, they may be destroying us or what they do may be entirely within our control. Future physical research will find out. A microscopic speck of yeast under proper conditions will produce 75 tons of edible food in ten days. What blessings may not the electron and the cosmic rays some day confer on a perishing race when their incredible hidden energy is tapped and brought under control.

Human progress may be compared to an ascending spiral, and the course of civilization may be divided into successive periods of activity and apparent rest, each of which is destined to make its special contribution to the total sum. Now it is to art, now to religion, now to the science of Government, now to literature, now to philosophy, now to physical science, now to industry that we point in evaluating these epochs, for these are the things of the spirit and the intellect that do not perish though heaven and earth pass away.

When Shakespeare was born, our English literature was represented by Chaucer with his Canterbury Tales, and the struggling efforts of Langland with his Piers Plowman and John Gower with his Confessio Amantis, together with some pastorals and interludes and a few early plays like Gammer Gurton's Needle, and Ferrox and Pollux. Save Chaucer they were not important in themselves. The next fifty years not only made a language but a literature. It brought into being works, the like of which have not been equalled since. It seems as if all the imagination and resources of the race which had been growing roots for many generations suddenly blossomed into Shakespeare, and Ben Jonson, and Marlowe, and John Milton. This, of course, is naming only a few, because men of real first-rate capacity sprang up everywhere. In its freshness and verve and spirit, no other period, certainly in our literary history, has approached that stretch of two generations beginning with Edmund Spenser and Sir Philip Sidney, reaching its height in William Shakespeare and ending with the lofty refrains of John Milton.

Coming to the later period, perhaps Charles Darwin was the Chaucer of our time. It may be that Faraday and Joseph Henry had their counterparts in the earlier day in another field. But broadly speaking, it is true that with occasional exceptions the human mind had lain fallow in the field of practical achievement until 1875, just as it had in the field of language and literature before 1575. And then what a burst of glory. Graham Bell comes with the telephone, Edison with the electric lamp and a system to work it. Power, whether developed by steam or water, once stationary, is now mobile. The motor car replaces the horse, the flying machine conquers the air, and radio waves, knowing no physical barrier, become carriers of the valuable intangibles of life to all people everywhere. So the intellect of man blossoms again and makes amazing contributions to human welfare.

The Poet of Today

In the words of Bagehot, Shakespeare's works could only have been produced by a first rate imagination working on a first rate experience. But, he added, "to a great experience one thing is essential—an experiencing nature." In other words, receptivity and appreciation of the things in the midst of which we live. There is more than a coincidence in the fact that the generation following Columbus produced a Copernicus and a Luther, and the next a Galileo and a Shakespeare. Emerson said: "The poet is the man who sees and handles that which others dream of, traverses the whole scale of experience, and is representative of man, in virtue of being the largest power to receive and impart." He is "a heart in unison with his time and country."

And so, Mr. President, I salute the workers in physical research as the poets of today. It may be that they do not write in verse, but their communications are of such lively interest that they are on the fornt pages of our newspapers and command space in our cultural periodicals. They appeal to the imagination of us all. They contribute the warming glow of inspiration to industry, and when industry pulls their ideas down from the heavens to the earth and harnesses them for practical service, it, too, feels that it is an important actor, not only in the making of things, but on the larger stage of the human spirit. There may be enough poetry in the whir of our machines so that our machine age will become immortal.

The Relation of *Science* to INDUSTRY

By ROBERT ANDREWS MILLIKAN

A WELL known public speaker of fifty years ago once remarked ruefully after disastrous consequences had followed misplaced humor, "I rose by my gravity and fell by my levity."

I use this incident as an introduction to my speech on Science and Industry for the sake of calling attention to the fact that what is absurd or ridiculous today was perfectly good science, or at least good philosophy, not more than 350 years ago—that the very existence of the "laws of gravity" was discovered as late as 1650 A. D. and that "levity" and "levitation" have through all recorded history up to Newton been just as acceptable scientific ideas as gravity and gravitation—so recently have we begun to understand just a little about the nature of the world in which we live.

Nor do I need to go back 300 years to make my point as to the newness of our knowledge. It is within the memory of every man of sixty that in the great Empire State of New York the question could be seriously debated, and in the most intelligent of her communities, too, as to whether Archbishop Usher's chronology computed by adding Adam's 930 years to Enoch's 365 years to Methuselah's 960 years, etc., gave the correct date of creation.

Importance of Correct Understanding

But what has this to do with "Science and Industry"? Everything! For mankind's fundamental beliefs about the nature of the world and his place in it are in the last analysis the great moving forces behind all his activities. Hence the enormous practical importance of correct understandings. It is his beliefs about the nature of his world that determine whether man in Africa spends his time and his energies in beating tomtoms to drive away the evil spirits, or in Phoenicia in building a great "burning fiery furnace" to Moloch into which to throw his children as sacrifices to his God, or in Attica in making war on his fellow Greeks because the Delphic Oracle, or the flight of birds, or the appearance of an animal's entrails bids him to do so, or in medieval Europe in preparing for the millenium to the neglect of all his normal activities and duties as he did to the extent of bringing on a world disaster in the year 1000, or whether he spent his energies in burning heretics in Flanders or drowning witches in Salem, or in making perpetual motion machines in Philadelphia or magnetic belts in Los Angeles, or soothing syrups in New England.

Dr. Millikan, in addition to being one of the world's preeminent scientists, is an extremely articulate one and has been foremost in bringing to the public a realization of civilization's debt to, and dependence upon, research in pure science.

Dr. Millikan is Director of the Norman Bridge Research Laboratory in Physics at Pasadena. He is a member of leading scientific societies, and has been the recipient of many honors in the scientific world. He was Edison Medalist (A. I. E. E.) for 1923, Hughes Medalist (Royal Society of Great Britain) for 1923 and winner of the Nobel Prize in physics in 1923.

This address was delivered recently over the radio from Station WGY Schenectady, as a part of the "Woman's Home Companion" Hour.

One-tenth as Useful

The invention of the airplane and the radio are looked upon by everyone as wonderful and pre-eminently useful achievements, and so they are—perhaps one-tenth as useful as some of the discoveries in pure science about which I wish to speak.

This new achievement of the race, this new capacity for education was after all only an inevitable incident in the forward sweep of pure science. which means simply knowledge, knowledge of the nature and capacities of the physical world, of the ethereal world (to which the radio belongs), of the biological world and the intellectual world; for this knowledge, as man acquires it, necessarily carries applied science in its wake.

What Made Airplane Possible

Look for a moment at the historic background out of which these modern marvels, as you call them, the airplane and the radio, have sprung. Neither of them would have been at all possible without 200 years of work in pure science before any bread and butter applications were dreamed of—work beginning in the sixteenth century with Copernicus and Kepler and Galileo, whose discoveries for the first time began to cause mankind to glimpse a nature, or a God, whichever term you prefer, not of caprice and whim as had been all the Gods of the ancient world, but instead a God who rules through law, a nature which can be counted upon and hence is worth knowing and worth carefully studying. This discovery which began to be made about 1600 A. D., I call the supreme discovery of all the ages, for before any application was ever dreamed of, it began to change the whole philosophical and religious outlook of the race, it began to effect a spiritual and an intellectual, not a material revolution—the material revolution came later. This new knowledge was what began at that time to banish the monastic ideal which had led thousands, perhaps millions, of men, to withdraw themselves from useful lives. It was this new knowledge that began to inspire man to know his universe so as to be able to live in it more rationally.

As a result of that inspiration there followed 200 years of the pure science involved in the development of the mathematics and the celestial mechanics necessary merely to understand the movements of the heavenly bodies—

useless knowledge to the unthinking, but all constituting an indispensable foundation for the development of the terrestrial mechanics and the industrial civilization which actually followed in the nineteenth century; for the very laws of force and motion essential to the design of all power machines of every sort were completely unknown to the ancient world, completely unknown up to Galileo's time.

Do you practical men fully realize that the airplane was only made possible by the development of the internal combustion engine, and that this in its turn was only made possible by the development of the laws governing all heat engines, the laws of thermo-dynamics, through the use for the hundred preceding years of the steam engine, and that this was only made possible by the preceding 200 years of work in celestial mechanics, that this was only made possible by the discovery by Galileo and by Newton of the laws of force and motion which have to be utilized in every one of the subsequent developments. That states the relationship of pure science to industry. The one is the child of the other. You may apply any blood test you wish and you will at once establish the relationship. Pure science begat modern industry.

In the case of the radio art, the commercial values of which now mount up to the billions of dollars, the parentage is still easier to trace. For if one's vision does not enable him to look back 300 years, even the shortest-sighted of men can scarcely fail to see back as much as eighteen years. For the whole structure of the radio art has been built since 1910 definitely and unquestionably upon researches carried on in the pure science laboratories for 20 years before anyone dreamed that there were immediate commercial applications of these electronic discharges in high vacuum.

The Same Story Everywhere

It is precisely the same story everywhere in all branches of human progress. I suspect it would be difficult to find one single exception. Here is the latest illustration that came to my attention recently in a letter from the Air Reduction Sales Company. It reads as follows: "We take pleasure in handing you herewith a complete set of luminescent tubes, each containing in the pure state one of the elements of the air, namely, nitrogen, oxygen, argon, hydrogen, neon, helium, krypton and xenon. It seems to us worthy of note that at the beginning of this century these gaseous elements as such had practically no commercial value or significance. Today the estimated value of the plants and equipment that have been created either to manufacture or to use and handle these gases in industry amounts to three hundred million dollars."

The writer of this letter might have added that the chain of discovery which led up to this result started in the most "useless" of all sciences, astronomy; for helium, as its name implies and as everybody knows was first discovered in the sun with the aid of the spectroscope, and thirty years later it was its discovery in minute amounts in our atmosphere, also with the aid of the spectroscope, that set us looking for the other inert gases of which the letter speaks and which have recently found such enormous application in neon tubes and the like.

But why continue this recital, for no intelligent man today needs to be convinced that our material prosperity rests wholly upon the development of our science. It is as to the broader values, intellectual and spiritual, that even intelligent men sometimes express doubt. Let me then start with the foundations that I have already laid and try to show to what these beginnings are leading, whither we are going, not materially, but as feeling, thinking and willing beings.

The Soul of Prosperity

Was Pasteur only a scientific enthusiast when he wrote "In our century science is the soul of the prosperity of nations and the living source of all progress. Undoubtedly the tiring discussions of politics seem to be our guide—empty appearances! What really leads us forward is a few scientific discoveries and their application."

Or was H. G. Wells, himself not a scientist at all, merely talking nonsense when he wrote quite recently (and note that he is not talking about a material thing either):

> "When the intellectual history of this time comes to be written, nothing, I think, will stand out more strikingly than the empty gulf in quality between the superb and richly fruitful scientific investigations that are going on, and the general thought of other educated sections of the community. I do not mean that scientific men are, as a whole, a class of supermen, dealing and thinking about everything in a way altogether better than the common run of humanity, but in their field they think and work with an intensity, integrity, breadth, a boldness, patience, thoroughness, fruitfulness, excepting only a few artists, which puts their work out of all comparison with any other human activity. In these particular directions the human mind has achieved a new and higher quality of attitude and gesture, a veracity, a self-detachment, and self-abrogating vigor of criticism that tends to spread out and must ultimately spread to every other human affair."

Man Looks Around

We have learned within the past half dozen years through studies in radio activity that this world of ours has in all probability been a going concern, in something like its present geological aspects as to crustal constituents, temperatures, etc., for more than a billion years, and hence that the human race can probably count on occupying it for a very long time to come, say another billion years; and further, that mankind has been doing business on it in something like his present shape for something like 20,000 years, or possibly 50,000, but in any case a time that is negligibly small in comparison with the time that is behind and the time that is presumably ahead of him—in other words, we have learned that mankind, speaking of him as an individual human being, is now just an infant a few months old at the most, an infant that up to about one minute ago, for the 300 years since Galileo is but a minute in the geological time-scale, has been lying in his crib spending his waking hours playing with his fingers, wiggling his toes, shaking his rattle, in a word, in simply becoming conscious of his own sensations and his functions, waking up, as he did amazingly in Greece, to his own mental and emotional insides. Just one minute ago he began for the first time to peer out through the slats in his crib, to wonder and to begin to try to find out what kind of an external world it is that lies around him, what kind of a world it is in which he has got to live for the next billion years. The answers to that question, even though never completely given, are henceforth his one supreme concern.

In this minute of experience that he has already had he has tumbled down in his crib, bumped his head against the slats, and seen stars—real ones and unreal ones, and he hasn't yet learned to distinguish with certainty between those that actually exist and those that only seem to exist because his eye-balls have been subjected to the pressure that comes from a blow, and so he is reaching out his hands part of the time trying to grasp illusions, and yet slowly, painfully learning, bit by bit, that there is an external world physical and biological, that can be known, that can be counted upon, when it has once become known, to act consistently, not capriciously, that there is a law of gravity and that it isn't necessary to be covered with bruises all the time because he forgets that it exists, that there is a principle of conservation of energy, and that all constructive and worth while effort everywhere must henceforth take it into account and be consonant with it, that it is not worth while to spend much time hereafter with sentimentalists who wish that that law did not exist and sometimes try to legislate it out of existence, that again there are facts of heredity that it is utterly futile to inveigh against, that our whole duty is rather to bend every energy to know what they are and then to find how to best live in conformity with them, that in a single sentence there is the possibility ahead of mankind of learning, in the next billion years of its existence, to live at least a million times more wisely than we now live. This is what Pasteur meant when he said "What really leads us forward is a few scientific discoveries and their applications." This is what Wells meant when he contrasted the result of the objective method of learning used in the pursuit of science with what he calls "the general thought of other educated sections of the community." The one guesses and acts upon its hunches or its prejudices, the other tries at least to know, and succeeds in knowing part of the time.

We Need Science in Education

We need science in education and much more of it than we now have, not primarily to train technicians for the industries which demand them, though that may be important, but much more to give everybody a little glimpse of the scientific mode of approach to life's problems, to give everyone some familiarity with at least one field in which the distinction between correct and incorrect or right or wrong is not always blurred and uncertain, to let him see that it is not true that "one opinion is as good as another," to let everyone understand that up to Galileo's time it was reputable science to talk about gravity and levity, but that after Galileo's time the use of levity became limited to the ridiculous, that "the town that voted the earth was flat, flat as my hat, flatter than that," had a perfect right to exist before 1400 A. D. but not after that date, that we are learning slowly through the accumulated experience and experimenting of the centuries, especially since 1600 A. D., more about the eternal laws that do govern in the world in which we live. And for my own part I do not believe for a moment that these eternal laws are limited to the physical world either. Less than sixty years ago, to take one single illustration, there existed a relatively large political party in the United States called the Greenback Party which jumped at conclusions and which conducted campaigns to induce our government to go over to a fiat money basis. I do not suppose such a party could exist today unless it be in states that pass anti-evolution laws, for there are some laws that have become established, even in the field of finance.

Knowledge Makes Us What We Are

This brings me to a brief discussion of the current opposition to the advance of science—an opposition participated in even by some intelligent people, on the ground that mankind cannot be trusted with too much knowledge, by others on the ground that beauty and art and high emotion are incompatible with science. Now, fear of knowledge is as old as the Garden of Eden and as recent as Dr. Faust, and there is no new answer to be made to it. The old answer is merely to point to what the increase in knowledge has done to the lot of mankind in the past, and I think that answer is sufficient, for it has certainly enfranchised the slave, and given every man, even the poorest, such opportunities as not even the prince of old enjoyed. Who would go back to the stone age because stone age man had no explosives? Of course, every new capacity for beauty and joy brings with it the possibility of misuse and hence a new capacity for sorrow. But it is our knowledge alone that makes us men instead of lizards, and thank God, we cannot go back whether we would or no. Our supreme, our God-like task, is to create greater beauty and fuller joy with every increased power rather than to turn our weeping eyes toward the past and fling ourselves madly, unreasoningly athwart the path of progress.

No, the only real question in a nation like ours is not whether science is good for us materially, intellectually, esthetically, artistically. Of course it is, for science is simply knowledge and all knowledge helps. The only real question is how the forward march of pure science, and of applied science which necessarily follows upon the heels, can best be maintained and stimulated for, as Pasteur said, "It is this alone that really leads us forward."

Whose Job to Support Science?

The answer to that question will depend upon the nature of one's whole social philosophy. If you think that social progress is best brought about by a paternalistic regime of some kind, by throwing upon a few elected or hereditary officials the whole responsibility for social initiative of all sorts, then you will say, "Let the government do it all; let it establish state universities and state research laboratories and state experimental projects of all kinds as it has done in most European countries and let the whole responsibility for our scientific progress lie in these institutions." But if you believe with the early makers of our nation in the widest possible distribution of social responsibility, in the wide-spread stimulation of constructive effort, in the nearest possible approach to equality of opportunity, not only for rising to wealth and position, but for sharing in community service, if you believe with the President-Elect that government should only step in where private enterprise fails, that it should act only as a stimulant to private initiative and a check to private greed then your industries which are themselves the offspring of pure science, will join in the great nation-wide movement to keep alive the spirit of science all over this land of ours through keeping pure science going strong in the universities, its logical home, and applied science going strong in the private industrial laboratories where it thrives best. No country ever had such an opportunity as ours, no country ever had such a widespread stimulation of individual initiative, such a large number of citizens who had learned to treat financial power as a public trust, such resources to command, such results to anticipate With our American ideals American industry cannot fail, I think, to realize this opportunity, and to support and keep in the finest possible condition, "the hen that lays her golden egg."

N. E. L. A. PUBLICATIONS

A list of current N. E. L. A. publications appears on pages 4 and 5 of this issue of The Bulletin. A more complete list may be obtained on application to the Sales and Order Department, National Electric Light Association, 420 Lexington Avenue, New York, N. Y.

A Great Utility's Obligations to Investor and Public

—*As Seen by Its President*

By M. S. SLOAN

IT has been my good fortune to be able to participate in the work of associations of our industry, state and national, both as member and officer for many years. No one who has not so participated can realize the value of such work. It affords opportunity for growth and professional development of the individuals engaged in it and by the interchange of information, discussion of new ideas and the acquaintanceships formed through meetings furthers cooperation among the companies and advances their standards of operation.

Our electrical industry has been singularly fortunate in that respect. Owing to the fact that our companies are public utilities serving each in its franchise territory and for many years under public regulation we have not had the business rivalries and jealousies to handicap us in the development of strong and efficient trade organizations which many businesses have encountered. There have been no manufacturing processes and trade secrets to safeguard from aggressive competitors. The discoveries, methods, practices found by any one of our member companies to be advantageous have been freely disclosed to all others to be adopted and applied in their judgment for their benefit and the benefit of their customers. I think this fact, as much as any one thing, has been responsible for the remarkable advance of our industry in its methods and in its standards of service.

Misguided Criticism

Recently we have heard a great deal of critical comment on the thoroughness with which our national organization has been organized, the scope of the work it has undertaken and the amount of money spent in carrying on such work. These elements have even been set forth as evidence of the existence of an electrical trust. Such criticism seems to me to be miguided and misinformed. The union of electrical companies into strong trade organizations has certainly not resulted in restriction of service at the disposal of the public. It certainly has not resulted in increased prices, either by restriction of service or by agreement to force customers to pay more money for what they buy. Quite the contrary. It has increased the general fund of knowledge, permitted the adoption of higher standards of service and by discussion and example has tended to bring about the lowering of prices wherever conditions permit. These, surely, are not the results usually attributed to a trust or any appurtenance of a trust.

The head of The New York Edison Company, Brooklyn Edison Company, Inc., The United Electric Light and Power Company, New York and Queens Electric Light and Power Company and The Yonkers Electric Light and Power Company does more than give his conception of the rights, duties and obligations of a public service company. Without realizing it, perhaps, he lays down the philosophy which has guided him in all his activities. Mr. Sloan is first vice-president of the N. E. L. A.

This address was delivered before the annual meeting of the Metropolitan New York Section, N. E. L. A., held at the Waldorf-Astoria Hotel Dec. 14.

In recent years our industry has been undergoing in marked degree a change in the setup of its units—a combining of companies into larger companies and systems, similar to conditions witnessed in many other lines of business. This also has been pointed to as evidence of an electrical trust, gradually tightening its tentacles on the defenseless public, its customers. Like the other evidence of existence of this alleged trust, this seems to me to be misguided and misinformed. The entire trend of business in our nation is toward larger units, toward combinations to reduce expenses, to improve commodities or service supplied to the public, and to reduce prices as and when possible. In our industry it has been a natural evolution, a mark of progress in our work, an inevitable development for the better carrying out of our task. It has resulted in notable improvements in the service supplied to large areas of our country and its results in price reduction have been evident. They have been favorably commented on by the Public Service Commission of this State and have not passed unnoticed by regulatory bodies elsewhere.

The companies serving this city are large organizations, but like others they are subject to the conditions which have dictated such combinations. Those conditions have operated, and if I may I'd like now to address myself to the situation thus produced.

The Situation in New York

We are engaged in one of the most important and interesting developments in connection with furnishing electrical service in this territory of any which have occurred since the very beginning of the central station industry with the opening of the Pearl Street plant. Here is a group of major electrical companies serving a very large part of New York City, united in management as well as ownership and other companies associated through common ownership, which take in a considerable territory outside of New York City proper. The whole group is being created into a system unified in ownership, control. operation and management. Taken as a unit, it is the largest electrical utility in the world—the largest in investment, in number of customers, in service facilities and in amount of service sold. It is the largest also in opportunity for service to the public.

The advantages of this consolidation are obvious to us who are engaged in this business. They are not so obvious perhaps to the general public, and yet the proceedings before the Public Service Commission, as a result of which the consolidation was authorized, made it apparent that they were appreciated at least in general outline. Chief among these advantages is the fact that this consolidation brings interconnection into effect in day to day operation instead of as an emergency measure or something to be used only under special conditions. Operation as a system wipes out company lines in the dispatching of power. It means the obtaining of maximum efficiency and economy in the use of all the plants in the system in handling the load. Operation as a system means the possibility of applying technical improvements, advances in the art, at once and on a large scale instead of piecemeal, company by company. It means the most complete and efficient employment of capital already invested in plants and equipment, and it reduces the requirements for new capital investment to care for future growth in the territory served by the system. When new financing becomes necessary it means that money can be hired on the most advantageous terms; even more advantageous than had been possible in the past although the companies as individual entities were large enough and sound enough financially to command good credit and good terms in acquiring new capital. It means economies in purchasing and in administration. It means the possibility of unified policies of operation, of merchandising, of customer relations and of relations with the general public.

Maximum of Efficiency and Economy

In short, the consolidation of these companies into a system represents the maximum possibility of efficiency and economy in all departments and phases of public utility operation. It presents the maximum opportunity for supplying the highest grade service to the public, and, by reason of the economies achieved, of selling that service to the public at the lowest possible price.

We are under mandate as a part of the conditions on which we are permitted to make this consolidation to share the benefits obtained from it with the public. This we intend to do, not alone because we are expected by the State regulating authorities to do it but first and foremost because it is our duty as public servants to do it. Public service corporations occupy a relationship toward the public which is different from that of any other business organization. The law says they are "affected with a public interest." Any consideration of the relationship of utilities to the public, therefore, must begin with that fact and never get away from it. Our companies have certain privileges for the use of rights or property of the public which other businesses do not enjoy. The companies pay for these privileges in various forms of taxation and this use of public property is permitted in order to enable the companies to furnish a service which is essential to modern living, reaching all the people with it as they could not be reached without such use of public streets and highways.

A Heavy Obligation

Nevertheless, these privileges are granted to us by the public. Without them we could not do business and our business produces profits, as that term is ordinarily understood, for those who have invested in it. Moreover, we have exclusive right to furnish electrical service to the public in our franchise territory. This is granted to us by public authorities and is for the benefit of the people because a public utility is recognized as what the economists call a natural monopoly. Still we do have this monopoly privilege and it is for our business advantage. What I am saying gets down to the fact that the public does more for us in thus enabling us to carry on our business under present conditions than it does for any other class of business. It has thus placed us under a heavy obligation.

In consideration of the privileges it grants to us the public regulates us as to standards of service, as to rates and as to capitalization, but because it does more for us than for others it expects more from us, and I hold that it has a right to expect more from us. The law obligates us to furnish safe and adequate service at fair and reasonable rates and the Public Service Commission is empowered to check us up and see that we comply with the law. Mere compliance with the law's provisions would not be enough for us, serving the public we do in this greatest city in the world. We have to do more than that. We have to go beyond the letter of the law's requirements and consider and live up to the spirit of those requirements. It was to enable us to do just that—to comply with the spirit of the law in the highest and fullest measure—that this consolidation of companies into an electrical system serving the Metropolitan district was brought about. We are trustees for the interests of the public as well as trustees for the investors in these properties. We can do our duty to both with success only as we fulfill our obligations to the public in the most complete measure.

What We Owe to the Public

Let us stop and consider a moment what we, as a public service organization, owe to the public. First, we owe, obviously, a technical service which shall be just as good as we know how to make it; as safe and as unfailing as the very best brains of the technicians can produce. We owe a service ample to supply every demand that can be made on it at any moment of day or night. That means that our plants and distribution facilities must be built well ahead of the demands as we calculate them from year to year, and they must be kept up to date, equipped with the most modern generating machinery and operated according to the highest standards of the electrical art.

We owe a service which is broadly human and helpful to our customers. This means that all of our people, all of us engaged in serving the public, must be alert, intelligent, well trained in our duties, courteous in all contacts with the public and possessed of a desire to do everything we can to make our service useful to the customers in every way.

We owe a management which is honest and square dealing, which is efficient and economical in its handling of the companies' affairs, which is sensitive to public opinion, particularly to the public's needs and desires and willing and anxious to meet them. We owe a management which is broad-visioned so that it can plan for the future while operating satisfactorily in the present. We owe a public policy which takes cognizance of all of these matters and earnestly and sincerely endeavors to translate them into facts which are a part of the daily routine of operation. We owe a public policy which recognizes that the public and the public utility are in effect partners, and which therefore shares without hesitation and without quibbling the benefits derived from efficient and economical operation between the investors in the utility and the customers of the utility.

In Position to Live Up to Obligation

Briefly stated, those are the obligations of the public utility to the people as I see them, and this consolidation of companies was brought about so that we may be in better position than ever before to live up to those obligations.

Now what does this require of us as individuals, and all of the others among the 30,000 employees of this system? As I see it, it requires an absolute and complete realization that this job of ours is a job of public service. That means that we must furnish 100 per cent devotion to the public interest. To do this we must put 100 per cent effort into our jobs and give 100 per cent loyalty to our organization. I regard it as elementary that the public utility is no place for hangers-on, or time-servers, for office politicians and others of that ilk, for people with outside business interests or aspirations and ambitions which will divide their loyalty, interest and effort between these outside interests and their jobs.

Neither as a business concern nor as an agency of public service can a public utility tolerate anything less than the best.

When it can be done, these companies in the system will be consolidated into one company as the final process in unifying operations and simplifying the situation in respect of service. This company will be the largest electrical utility in the world. It is my ambition to see it the very best also—leader and example as to quality of service and enlightened and liberal policies in its relationship to the public.

An Outstanding Institution

There is no reason why a public service company should not be so well operated, should not furnish such high grade service and be so well known and understood by the people it serves that they will be proud of it as an outstanding local institution. I hope to see our utility occupy that position; to see it known and recognized as an honest, trustworthy, valuable public servant and respected and esteemed on those grounds.

Now that is a task for all of us to work out. It's a goal, if you please, for all of us to endeavor to reach. It isn't something to be brought about by me alone or by you alone. Teamwork is needed to accomplish the task; organization effort by every person from top to bottom in the organization. The meter reader, the repairman, have their part in this effort just as much as the president, and it may well be that their part is somewhat more critical because in the course of the day's work they meet and have contact with many more customers than the president does.

Let Us Catch the Vision

Let us try to catch the vision of this situation we must work toward. Here are a million homes dependent on us for electrical service to make life easier, better, happier. Here is a great industrial community and we've got to supply the power to keep its thousands of machines moving. Here is the greatest commercial, trading, and financial center in the world with its vast hotels, stores, theaters, public buildings of every nature using our service and dependent on it. Here are six million people going about their daily affairs, their lives woven together into the complex pattern produced by modern civilization in a metropolis. This city could not function without our service. Its affairs would be disrupted, hurled into chaos, if some inconceivable event should put our plants and equipment out of business. That is the measure of our importance in the scheme of things. And so whatever we do to better our service, to improve our operation, to make electricity more useful and more widely available, is of direct and measurable benefit to those people and the community.

A Responsibility! An Opportunity!

What a responsibility rests on us! What an opportunity for service is ours! I don't mind saying I consider this job of ours—mind you, I say ours because it is a job for all of us in this system which has been created—the biggest and most engrossing the entire public utility field offers. It's the biggest and most potential in all its possibilities. It will require everything we've got of brains and energy and character and good citizenship and public spirit. But we've got those qualities. It is up to us to put them into our work day in and day out, year in and year out.

There could by no possibility be a higher demand on us; but we can meet it and I know we will. The degree to which we do meet it will be the measure of our fitness for our work. We don't dare fall short.

SHORT SERMONS

It is not enough that a few Big Business leaders shall understand what is going on. It is necessary that the mass of employers and employees shall catch the spirit of the times in order that they may prepare themselves for .. .. .. the New Economic Order and the new attitude toward business which must follow if American prosperity is to lead not only to a better living but to a larger life for all. —*Forbes Magazine.*

* * * *

There is no need to exaggerate what electricity can do. To date it has never been called upon to perform any duty that it has not proven itself equal to. The truth about household uses of electricity is as interesting and absorbing a story as one could wish and it is just as unnecessary and foolish to make fantastic statements about it as it would be to point to a rose or a gladiola.
—*Electrical News*, Toronto.

* * * *

If there has been one distinct injury to young people in the flaming youth period, it has been inflicted by the abatement of hero-worship. Admiration for a proficient elder in one's chosen art, craft, or profession, and a desire to win his approbation, have always provided young people with their most powerful impetus toward achievement. These have been out of fashion, and one may see the result in many a bright lad, who, too proud to learn, now faces life with a smattering of Menckenese sophistication and very little else. Taught to think that the world was his oyster, he now discovers that it is a particularly tough abalone. —*The Argonaut.*

* * * *

The man who becomes absorbed in doing his job and who finds adventure and happiness in making himself as useful, as creative, as productive as he knows how, is quite as likely to find himself moving up the ladder as the one who is thinking and worrying all the time about getting recognition and advancement.—*James D. Mooney.*

* * * *

A new type of creative artist is the business man, who by some peculiar faculty denied to the rest of us, is able to take ordinary men and materials and handle them so imaginatively that tens of thousands of people enjoy a superior existence.

* * * *

Basic economic conditions are sound, inventories not unduly expanded, credits and collections satisfactory, earnings of labor are high and employment steady, all of which presage a favorable outlook for 1929. —*Gerard W. Swope.*

Competition

How Will It Affect the UTILITY ENGINEER?

By C. A. COLLIER

"PRETTY soft! Pretty soft!" More than one salesman, central station or otherwise, has had this envious thought when under the pressure of quotas, direct and indirect competition, and the insatiable appetite of a modern sales department for more and more fodder in the form of orders. And while his think-wheels grind out the refrain, "Pretty soft!" he's more than likely thinking of the engineer—the fellow who, while he must occasionally work long hours under intensive, physical hardship, is not constantly harassed by will-o'-the-wisp quotas, hardboiled, flighty, temperamental, punching, complaining, "inspirational," driving, crazy, wonderful, or otherwise peculiar, though quite human, sales managers.

The engineer has often sat back musing over cycles and frequencies and grounds and load factors and other factors, dreaming on ways how science may help him correct these troubles. He has smiled at the poor devil of a salesman to whom calamity comes swiftly and suddenly when he lets up ever so slightly in his hurrying and scurrying for more business—calamity aided and abetted by competitors selling the same commodity, competitors selling commodities seemingly entirely foreign, yet costing dollars to buy, and by employers who still maintain that a salesman who doesn't sell isn't a salesman.

Science Comes to the Engineer's Rescue

Science has always come to the engineer's rescue, and he has corrected many of the things that have troubled him. The imperfections of electric utility service so common not so many years ago have been largely eliminated, albeit in their elimination costly engineering mistakes may have been made.

When a salesman makes the costly mistake of not producing any business for a month or two . . . well, he "gets the gate." In times past when more or less mediocre engineers made mistakes, the ultimate cost of which ran into the thousands of dollars and more, their misfortune was laid to the idiosyncrasies of the stuff they were working with, rather than to their inferior ability, and while quite a hullabaloo was frequently raised, some other major trouble developed before the whys and wherefores of the first hullabaloo were found out. Time, the enemy of the mediocre salesman, thus became the friend of the mediocre engineer by causing his earlier mistakes to be swiftly forgotten.

Mr. Collier is Vice-President of the Georgia Power Company in charge of commercial activities. He is a graduate of the Georgia School of Technology and a part of his public utility experience has been in an engineering capacity. He has been active in association work and is now President of the Southeastern Division, N. E. L. A.

The cruder shortcomings of rendering adequate electric service eliminated by efficient engineers, the astounding revelation is that in the face of practical economy in other businesses the electric utility business has increased its invested capital per unit of sale (the kilowatt). Weak brothers in the engineering fraternity who have managed to hold important engineering positions because the business has been growing so fast that their weakness as engineers has been overlooked are being reclassified. Some are being culled out, others are being correctly tagged and put into their proper niches, and still others, a very few, whose past records have placed upon them the hallmark of quality, are being launched into the *business* stream. (Please note that I didn't say they were being given better *engineering* jobs, although their launching as business men instead of scientists will give them the opportunity to *better* their engineering jobs.)

What a Business Man Is

A business man is not merely an accountant, an engineer, or a specialist of any kind. True, he may be more proficient in engineering than he is in accounting, more proficient in salesmanship than in finance, a better advertiser than he is an inventor. So, as engineers in the utility business develop into utility business men, they will learn that the utility business of today depends not solely on engineering for its existence; not solely on sales, as salesmen are sometimes tempted to claim; not entirely on super-efficient accountants, as some try to make you think it does; and not on smooth reading advertisements telling how good the service is. It depends on a combination of all, and the sooner all departments of the business learn that *they* exist for the business, and not the *business* for them, the better for all concerned.

Now, having developed into a business man, the engineer of tomorrow in the utility business will awaken to the fact that there is a vast difference between the *efficient* operation of a system and its *economical* operation. He will learn that many of the intriguing jimcracks so delightful to the engineer's soul, while doing all the manufacturers claim for them, cost away out of proportion to their betterment of the service, or the efficiency of the service, insofar as the customer is concerned, and that this increased cost is making it harder for the *business* to hold its own against other businesses. In other words, he will suddenly learn that while no one else in the territory in which he is doing business is in the same business, and that while *apparently* he has the exclusive right to do all the electric utility business within that territory, he *does not have the exclusive claim on the dollars of the people* living in that territory! He will learn that other businesses can, by getting the dollar away from the prospect, kill the utility man's chance of more business from that prospect.

Competition by Other Businesses

The engineer will also learn that there exists in the electric utility business what many of us have failed to perceive until recently—the keenest kind of competition by other businesses for the dollar the average citizen may have reposing in his jeans at any random moment. He would perhaps find, if he took a careful survey of trouser pockets along approved engineering lines and compared his results with the results of a similar survey which may have been taken by pants manufacturers a number of years ago, that holes in trousers pockets, or patched pants pockets, are now far, far fewer than formerly. He would perhaps then come to the logical conclusion that the reason for this is because of the fact that fewer dollars reach the inside of the breeches coin-repository—or that the dollars come out the top of the pockets so fast and furiously that they don't have time to wear holes.

He would further conclude that this was not because there are fewer shekels, but because there are more and louder appeals, "BUY!" not only at this particular store against that, but "BUY!" an automobile in preference to a radio, no matter from whom you buy it. "BUY!" milk in preference to reducing potions, regardless of the dairy which offers it. "BUY!" a trip to Florida instead of a fur coat, regardless of the railroad you ride on. "BUY!" shrubbery for your yard instead of paint for your house. "BUY!" an oil burner so you won't have to shovel coal.

The Industry That Gets the Dollar

He will ponder over these things, he will investigate, he will do many things, and then he will learn that the industry that gets the dollars is the industry that—

1. Makes a product, or renders a service, of high quality.
2. Delivers it efficiently.
3. Sells at a price which makes its product seem more desirable than the product (perhaps dissimilar but almost equally desirable) of another industry.
4. Collects the money due it.
5. Advertises consistently and constantly.

He will learn that the word "price" has not only to do with the selling and buying of commodities, but also with the volume or amounts of sales, and the amount of profits. Also, that price frequently prevents sales and consequently profits, and that reduced prices frequently make an industry prosperous, and perhaps just as frequently make it a bankrupt.

A Non-profit Business

Now in some respects the electric utility business is different from other businesses. In the first place, it is a non-profit business. It may earn a fair return on its money, but profits in the same sense as applied to other business are taboo. It has the exclusive right to sell electricity over wires in a given territory. Its business methods and books are open to public view. Otherwise its business is similar to any other business. It must offer its product at such a price so that its use will not be restricted. It must offer it at a price so that in the everlasting combat for the consumer's dollar there will be a tendency for him to get it changed into nickels, dimes and quarters, and spend a few more of them with the electric utility in his community. And if the price is too high, if it can't earn a fair return on the invested capital, then something must be done to increase sales. And the easiest way to increase sales of kilowatts or kumquats, peanuts or percolators, radios or race horses, is to reduce the price without impairing the quality. But, woe unto him who reduces prices below his costs! His sales will jump, but farewell profits, farewell fair returns on invested capital, farewell business!

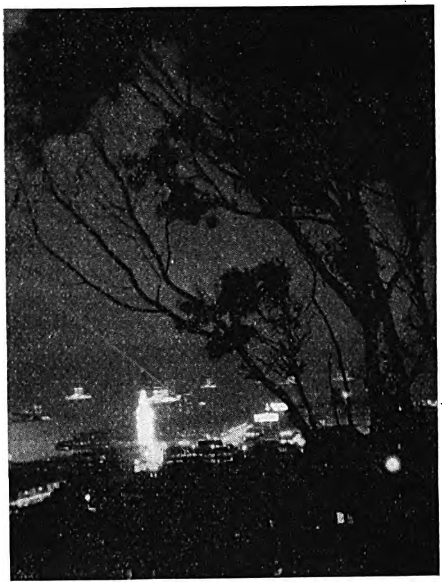
Now in the utility business, being a business operated at cost, it is obviously impossible to reduce prices without reducing them below the cost of production, unless the cost of production has first been lessened.

Where the Engineer Steps In

This is where the engineer of the utility business of today steps in. It is his job, as the manufacturing end of the business, to make his kilowatts so economically, to deliver them so efficiently that the sales department can sell them at a price to induce their wider and fuller use, and the collection department collect for them with a minimum of grief. One of the ways of reducing the cost of production in an industrial plant is to turn out more of a product without increasing the machinery or factory space. One of the ways of reducing the cost of the product of the utility business is to manufacture *more* kilowatts at the *least* investment per kilowatt.

When the engineer does that, the price can be reduced, the salesman can sell more of them or sell products which will induce their wider use, the fair return on the investors' dollar will not be endangered, and millions of mothers and fathers will no longer have to say, "For heaven's sake, Johhny! switch out the lights when you leave the room. They cost money!"

The good engineer of today and tomorrow has a bigger opportunity in the electric utility business than ever before, if he will but become a *business man* too! Nothing can retard the advancement of an engineer who has admixed his technical knowledge with the sort of business-sense so necessary to the sound progress of the industry.



LIGHTS OF THE CITY

I love the nights of the city.
When the myriad lights come on
And gleam through the dark with pity
From dusk to the early dawn.

They charm and beckon me ever
And beauty of night would be gone
If I thought again I might never
See the lights of the city come on.

—Pearl Sidney Payne in Edison Monthly.

The History of a Troublesome Problem

How INDUCTIVE COORDINATION Is Solving It

By J. C. Martin

INDUCTIVE coordination seems like a very modern term to most of us. Its predecessor, Inductive Interference, seems only a little less modern. However, its effects are as old as our industry. Its first appearance of any consequence was in connection with the relation between street railway systems and telephone systems which were first built on the ground return plan. Street railways began development after the telephone systems and made use of the earth in parallel with track rails as a return circuit. While the causes and effects in this field are not the same as what we now call inductive coordination, they were, in effect, merely another phase of what is a common problem arising out of the necessity for the various branches of the electrical industry to live and do business in the same physical areas.

One branch alone in an area can do things and conduct itself in a way that it cannot do when another enters the same area. The problem is fundamentally the same that exists in any human relations where communities are developing from what previously have been isolated individuals.

Adjustment Must Be Mutual

The greater the number of individuals in a group, the more complex their relations become and the greater the adjustments individuals must make to avoid interference with the rights of others. The duties are mutual and the adjustments are also mutual if justice is done to all. In the end the adjustments which involve individual sacrifice are the price of the advantages which the grouping gives. The compensations overbear the cost and the net result is a profit. I have long been convinced that until we view the problem of inductive coordination against this background we can have no hope of a satisfactory answer to the problem. Any other background leads inevitably to a dog-eat-dog situation in which the various branches of the industry and the community suffer.

Inductive interference is merely an uncontrolled manifestation of the most useful electrical property we have. Induction in our generators and transformers is the foundation of their operation. Linking this phenomena with so-called inductive coordination is a somewhat difficult mental feat for most of us. This is undoubtedly due to the fact that in one case controlled manifestation is producing a useful result that we have come to accept as a matter of course. The methods of control are well understood. In the other the methods of control have not been developed. We have paid no great amount of attention to the phenomena. Consequently it hits us unexpectedly and, because we do not fully grasp its significance and it sometimes proves distinctly embarrassing, we resent the problem. Resentment takes the lead and we are inclined to look at the phenomena as a new and decidedly unwelcome problem.

Mr. Martin in addition to his engineering experience with electric light and power organizations was at one time Western editor for the "Electrical World." He has been with the Middle West Utilities Company since 1923.

He became actively identified with Inductive Co-ordination work in 1921, and was Chairman of the Inductive Co-ordination Committee for two years. This address was given before a recent meeting of the Great Lakes Division, N. E. L. A. Engineering Section.

First Manifestation of the Problem

Historically its first manifestation as a commercial problem is the old familiar "cross talk" problem in telephone circuits. When there were only a few ground return telephone circuits operating over short distances the effect was unimportant. When the number of circuits multiplied, length increased and it also became necessary to place a number of such circuits on the same pole line, the interference with commercial results became such that some method of control became necessary. The metallic telephone circuit and the early transposition schemes which were relatively simple were the remedy for this particular kind of interference.

The period of development of this particular kind of inductive trouble may be roughly stated as between 1880 and 1890. It was one of the strong factors in the general change from grounded to metallic circuits for important telephone service which took place largely between 1890 and 1900. The dates given are only approximate since, like all developments, all practices were not abruptly abandoned and the new substituted. At this time, thirty years later, the ground return circuit for telephone service is widely used. The transition is still proceeding as conditions and service requirements change from the simple to a slightly more complex condition that the ground return telephone circuit cannot meet.

Through the late '80s and the '90s the electric street and interurban railways had a tremendous growth. Both the telephone and railway systems were attempting to use the earth as one side of their circuit. The result was what might be called "conductive interference" with the telephone circuits. If either had to abandon the use of the earth it meant a rather heavy expenditure for the reconstruction of existing plant facilities. The argument went to the courts and the electric railway systems won largely on the basis they were using the highways for transportation purposes and were, therefore, entitled to greater consideration in the public interest. This was a rough and tumble legal wrangle which could or would not be staged under the conditions which exist today. Today's conditions are so much more complex it is certain such a method would require so much time that it would render it valueless. It is entirely probable that the number of problems which would require settlement are too numerous and complex to be handled by court procedure. In any event we have learned that working out these problems in a friendly cooperative spirit leads to a better and more satisfactory solution than could be obtained by court action.

Battle Between A. C. and D. C.

From about 1885 to just after 1890 the battle between the direct and alternating current systems of distribution took place. As a side light it may prove interesting to some to go back to the electrical literature of the time and learn how impractical and even thoroughly dangerous the alternating current system is. 1100 volts in the view of individuals, at least, was a catastrophe and the term was considered mild.

Beginning roughly with 1890 the light and power distribution systems appeared in the inductive picture, adding complication to the general problem of inductive relations between electrical systems or circuits of different kinds. Through the '90s at least they could not be said to be much of a factor, but by the latter part of the period from 1900 to 1910, they were definitely in the picture, though still largely from the angle of low voltage circuits. However, during this period the transmission line ranging in voltages up to 66,000 had developed rapidly and during the latter part of the period the higher voltage transmission lines appeared definitely.

First Organized Effort to Study Problem

Culminating in 1911 in a set of specifications governing joint use construction, a large amount of work was done by an N. E. L. A. committee and by representatives of the telephone interests. It was in these specifications that the first hint of inductive problems appeared in a national way. Such mention as was made was incidental and was not featured as a matter of primary importance.

The first organized effort at a study of the problem appeared in California in 1912 when a committee representing the California Railroad Commission, the railroad interests, telephone and telegraph and the power interests was organized. A preliminary report of investigations was made in July, 1914, and a final report on September 28, 1917. Out of the work came a tentative set of rules promulgated in 1914 by the California Railroad Commission and a final revision of these rules in 1917 based on the final report.

The extensive network of transmission lines in California had produced an acute situation in the inductive relations between the power and telephone circuits. It may be said here that the power companies had not been entirely considerate of the position of the telephone companies, and, due to a lack of knowledge of the problem, failed in a number of ways to realize or recognize that a problem really existed. This attitude was not peculiar to California power companies. It was the general attitude of the power companies of the entire country at the time. A great deal of feeling and controversy grew out of the situation at that time. The attitude of the power companies was clearly revealed when an attempt was made in 1916 in the East to raise a few thousand dollars to assist the California power companies in the investigational work of the California committees which resulted in the final report.

The attempt was unsuccessful, due to the total lack of interest on the part of power company executives. They could not realize that the problem was as much theirs as it was that of the California companies.

N. E. L. A. Takes Up Problem

The entire problem appeared for the first time in an official way in the 1915 and 1916 Overhead Systems Committee of the National Electric Light Association. This was followed by the organization of the Inductive Interference Committee which finally became the Committee on Inductive Coordination. By 1920 the work was recognized as a definite official part of the N. E. L. A. technical work. At this time the only visible problem was that involving the Bell System interests, though it was realized that this represented only one phase of the entire problem. Both the Bell System and N. E. L. A. leaders realized that the probable outcome of the existing situation was a long wrangle and probable legal battle that would be costly and

Electricana

Mr. H. A. Snow, Chairman Statistics Committee: We are going to start printing some statistics in the N. E. L. A. BULLETIN in the January or February issues to liven it up a bit.

Mr. Paxton Little: Liven it up, did you say?—*From Transcript of Proceedings of Executive Committee Meeting, Accounting National Section.*

* * * *

***Anything*, Gentlemen, to liven up the BULLETIN.**

Bird Pecks Power Line and City's Lights Go Out

ROCHESTER, N. Y., Dec. 17 (A. P.)—A forty-minute tie-up in electric light and power service in a large part of the city and a two-minute flicker throughout the downtown district today heralded the passing of a bird, species unknown, which sought nourishment from one of the high tension cables of the Rochester Gas and Electric Corporation. When emergency crews arrived to straighten out the short circuits and fire caused by the experiment, they found a charred and feathered mass about the size of a robin.—*New York World.*

* * * *

It probably wasn't nourishment he stopped for.

Isn't That So?

Pittsville, Wisconsin.
December 3.

National Electric Light Association,
420 Lexington Avenue,
New York, N. Y.

Dear Sirs:

I am a high school student who has studied some on electricity and I just was wondering *what you would do if you could get the definition for electricity.* If you will answer I will give you a good outline to follow for solving this problem.

Sincerely yours,
CHARLES CHRISTENSEN.

* * * *

No telling what we wouldn't do.

* * * *

Pittsville, Wisconsin.
December 17.

National Electric Light Association,
420 Lexington Avenue,
New York, N. Y.

Dear Sirs:

The only definition I can give for electricity is this.

Electricity is a gaseous which mixes with the air. The things which make me think that this statement is true are as follows:

There is electricity in the air, you all know that. The body uses electricity; it must get it when breathing the air. What causes this electricity to come and go into these wires is the generator has some electricity in it. This electricity draws more electricity until it gets an over-supply of electricity, and has to send electricity out some way, so it goes into the wires. The turning of the generator gives the electricity current enough to draw more electricity.

If you wish any more proof I can send more.

Yours truly.
CHARLES CHRISTENSEN.

* * * *

At that Charles knows as much about electricity as some of his alleged betters who talk and write on the subject.

"What the BULLETIN Needs is S.A."

—*Friendly Critic*

Electric cooling systems,
The iceman's place may steal,
But will the housemaids kiss them?
They have no sex appeal!
Snapshots—Georgia Power Co.

* * * *

Electric heating systems
May keep us warm in bed,
But won't the hopeful bachelor
Try married life instead?
Buckshots—Porgy Power Co.

which probably would not produce satisfactory results.

After careful consideration, the Joint General Committee, representing both interests, was formed to study the problem cooperatively and handle it in a businesslike way. That work to date has produced as printed documents: Principles and Practices for the Inductive Coordination of Supply and Signal Systems, Principles and Practices for the Joint Use of Wood Poles and Inductive Coordination, Allocation of Cost between Supply and Communication Companies, on a Cooperative Development and Research program dealing with various factors in the technical phases of the situation. I shall not attempt to detail this recent history. However, it must be realized that this work is the foundation of our entire problem as it affects the telephone interests. The work is only partly completed and will require several years more. That it will be succeeded by similar problems is certain, since the problems arise out of the growth of the two branches of the industry.

Telephone Work Only One Phase

That the telephone work is only one phase of the situation has been illustrated since 1920 from unexpected sources. That the telegraph interests were also involved, and to some extent railway signal systems, was known, but the problems had apparently not been acute. Almost simultaneously from 1923 to 1926 two entirely new phases appeared. Radio broadcasting literally flashed into view, producing in the space of that time problems as many and, because of their direct public relations phases, as difficult as those which had previously developed in the relations with telephone systems. At the same time automatic train control systems, under orders from the Interstate Commerce Commission, appeared in the picture. These developments you are familiar with. It seems at present that automatic train control problems, from an inductive relation standpoint, are not likely to reach an acute stage. The problem has been recognized early in the developmental stage of the apparatus. Further, the fact that railway electrification is a live problem has undoubtedly provided an incentive to an early solution of the inductive relations side of the problem.

Radio interference troubles are still with us, with every prospect of being a permanent and exceedingly active guest. Apparently, however, the acute stage of this problem is past and we have a firm grasp of it that will enable us to keep ahead of the game.

More Electricana

You Bet It Does!

The last annual report of The Public Ownership League of America states that it has campaigned against the indeterminate permit legislation, conducted numerous municipal ownership campaigns, given lectures, held debates, and conferences, etc., in nine different States, promoted public power districts, continued the fight for government operation of Muscle Shoals, Boulder Canyon and other federal hydroelectric projects, and continues: "Such an educational campaign is greatly needed to counteract the propaganda of the private power companies and inform the public."

The North Central Electric Association News for November comments: "It will be noted that what the private companies do is propaganda and what The Public Ownership League does is educational. It makes a difference whose meal is frying, doesn't it?"

Official Buried Alive to Cure Electric Shock

PRAGUE, CZECHOSLOVAKIA, Nov. 29 (A. P.)—Town Councillor, Kutclera, of the little Moravian town of Rakova, was deliberately buried alive after being rendered unconscious by coming in contact accidentally with a highly charged electric wire.

Upon the advice of a woman doctor of the village, he was placed in a hole in the ground in the belief that the earth would absorb the electricity from his body.

But when dug up after thirty minutes interment, Kutclera was dead.

* * * *

What's needed now is a Czechoslovakian version of the Prone Pressure Method.

(Adv't, see page 5)

Senator Introduces Bill

—Headline in Most Any Paper

WASHINGTON, D. C., (Special Correspondence).—Stringent legislation designed to control certain alleged pernicious activities of individuals affiliated with the electric light and power industry will soon be introduced into Congress. The new legislation, we are advised by an unimpeachable source, is sensational in its stringency, the police practices of leading countries of the world including Russia, both under the Czar and the Bolsheviki, having been drawn upon.

All persons now employed by operating, holding, management or finance companies in the electric field, and those employees of concerns in other fields, who come in contact with public utility organizations of any kind will be required to register. A special office patterned after the Soviet central police bureau will be charged with this duty. Registration will involve the filing of complete family history, photographs, finger prints and Bertillon measurements and registrants will be required to sign a waiver of immunity and a pledge not to invoke those clauses of the Constitution dealing with unreasonable search and seizure.

Severe penalties are provided in the contemplated legislation for those misguided or wicked persons who persist in retaining their pernicious employment. In order that employees of these utilities may have an opportunity to understand their precarious situation, certain minor limitations are set on their personal conduct. For instance, starched collars are prohibited to the men, and the women employees under the age of sixty may not bob their hair. These and other regulations of the same nature will remain in force for a three-year period, at the end of which it will be assumed that all persons still in the employ of the proscribed businesses are irrevocably steeped in what is sometimes termed the "spirit of public service." These reprobates will lose their citizenship. The women will be branded on the brawn of the left thumb and the right ear will be cut from all the men. The authors of the bill confidently expect that some considerable time before the expiration of the three years grace, the electric light and power companies will have no employees.

This legislation, there is reason to believe, will in no way apply to employees of municipally owned and operated electric light and power plants.

* * * *

Will it come to this?

Last, and far from least, the telegraph problem is in the picture actively. Last year a Joint Committee with the Western Union was formed and will be heard from with its contribution in the near future. There is every probability that the development of newer and more sensitive telegraph devices will provide their share of problems. A great many developments are taking place very rapidly.

What the Industry Should Do

In conclusion, I want to again call attention to my opening comparison between the adjustments that occur when individuals pass from the stage of isolated units dependent only on themselves to communities where the relations between individuals become complex. Our complex community relations have existed so long that they have become second nature. Our own experience with them has been since childhood, so that we have never thought of the restrictions we are subject to as restrictions.

As an industry, we are now barely out of the period when the various phases of the electrical industry could and did exist as isolated individuals. As workers we are still living largely in the mental atmosphere of the individualistic period of the industry. In the foregoing I have traced very briefly the growth of industry complexity as it affects inductive relations. What the next new factors may be, no one can predict. It is certain that the constant growth of population and its accompanying growth of utility service will increase the complexity of our intra-industry problem of handling inductive relations. As in our community relations, we will probably find increasing restrictions of one character or another for the good of the public we serve. Our greatest problem is that of designing our various systems and maintaining an attitude toward each other that will keep legislative restrictions to the minimum, or, if possible, non-existent. We know that the better the attitude toward each other and the public on the part of the various parts of the electrical industry, the smaller those legislative restrictions will be. What they are and how severe they will be is a matter almost altogether in our hands.

The Electric Light and Power Industry During 1928

REVIEWED BY THE DEPARTMENT OF PUBLIC INFORMATION, N. E. L. A.

CONTINUED expansion of facilities by the electric light and power industry and a greater diffusion of its service to all classes of consumers was a feature of public utility operation in 1928. The production of electricity by all agencies which contribute to the public supply, according to the preliminary estimate of the United States Geological Survey was approximately 88,000,000,000 kw-hr., in addition to which another 1,600,000,000 kw-hr. was imported from Canada. This total available supply was as much as the production of all the rest of the world. During the past seven years, the industry has added more than 13,500,000 kw. to generating capacity; it has constructed nearly 50,000 miles of high voltage transmission lines; doubled the output of its energy and increased the number of its customers by more than 10,000,000.

New Consumers

Approximately, 1,400,000 new consumers were added during 1928, making a total of 23,000,000 now served by this industry. Of these, nearly 19,000,000 are household users, indicating the rapid increase in the diffusion of electric service to the homes of the nation. Twenty-five years ago, the total number of all consumers was 650,000. Electric service has now been extended to every city with a population of 5000 and over; to 97 per cent of all communities with populations between 1000 and 5000; to 50 per cent of all communities between 250 and 1000; and to more than 25 per cent of all hamlets of less than 250 population.

Farms connected with the electric power lines in the last three years have increased by over 125,000, making a total of nearly 350,000 farms now enjoying electric service. The increasing activity of the light and power companies in promoting the further expansion of this service is indicated by the fact that more than 400 men are now devoting their entire attention to the extension of electricity to the farms of the nation. In addition to this, a comprehensive program of cooperation with farm agencies, agricultural colleges, and the United States Department of Agriculture has been further enlarged during the year.

In mining and manufacture, electricity has become the power medium of the nation and the central station power plant the point of conversion of fuel and water into energy for useful service. Local installation of boilers and engines in factories has nearly come to a standstill. Between 1919 and 1925, the total net increase of 6,500,000 hp. in factories was in electrical motors purchasing power from interconnected systems. Three-quarters of all the power in industry is now electrical and, of this electrical power, two-thirds is being purchased from the lines of the light and power enterprises. On the average, each factory wage-earner today has nearly 5 hp. at his command, or more than twice that in 1900.

New Construction

New construction has been devoted more largely to additional generating and distributing systems than to the building of large-scale transmission systems, although continued progress in the interconnection of adjacent systems and the replacement of small local power plans by service from high-tension lines has been made during the year. During 1928 several important generating plants have been completed and put into service. The more noteworthy of water power projects are the 378,000 hp. hydro-electric plant at Conowingo, Md., and its tying in with one of the largest steam-electric "power pools" of the United States; the Jordan dam of 144,000 hp. on the Coosa River in Alabama, and the 70,000 hp. plant at Bucks Creek, Cal., operating on a head of 2561 ft.—the highest which has thus far been attempted. In the field of steam generation, the year has been notable for the commencement of the State Line plant near Chicago, with an ultimate capacity of more than 1,000,000 kw.; the completion of the first unit at the Powerton plant, south and east of Chicago, and the changed aspects of the relationship between steam and water-power which the success of the new units of the Southern California Edison Company has brought about on the Pacific Coast. It is worthy of note that, for the coming year, probably because steam-generating costs are now comparable to hydro-generating costs, not one hydro-electric plant is scheduled for completion in the entire region west of the Rocky Mountains, while plans have been announced for three large steam plants and the additional installation of generators in as many more.

Progress of Interconnection

The absorption of small, isolated enterprises—both municipal and private—into larger and more economical units and the replacement of little generating plants with continuous service from the high-tension lines of the interconnected systems, has continued with increasing momentum. At the same time, the tendency toward large-scale mergers of important companies has, apparently, shown a slight decrease as compared with the previous year. Two such consolidations are, however, noteworthy: the acquisition by the United Gas Improvement Company of the Philadelphia Electric Company and the merger of the Brooklyn Edison Company and the electric companies of the Consolidated Gas System in New York City. A contributing reason for the apparent decrease in the number of mergers is found in the comparatively higher cost of money and the rise in interest rates during the second half of the year. As a result, new financing and refinancing by enterprises engaged in the operation, management or financing of electric utility properties, has fallen somewhat below figures for 1927. The total of electric utility securities sold by investment houses during 1928 is estimated to be in the neighborhood of $1,825,000,000, against approximately $1,900,000,000 in 1927. Inasmuch as an increased (but not immediately ascertainable) number of investment trusts appears to have figured in this year's total, a slight falling off during the year is apparent.

At the same time, *new construction* by the utility companies has been carried on at approximately the same rate as during the two previous years, with the result that the total investment of the electric light and power enterprises in plant and equipment at the end of 1928 was carried on the

(*Continued on page 62*)

Amplifier Calls on the Professor

By Amplifier

AMPLIFIER called on his old friend, the college professor, the other day, and the talk turned to the subject of educational material for use in public schools; that is, material other than approved text books in the official schedule.

"I see no reason," said the professor, "why any great national industry should not furnish public school systems with informational material concerning its business, provided that the text is confined to factual statements and also provided that it is presented to the schools through the proper channels. I personally have every confidence in the intelligence and honesty of the average superintendent of schools and believe that the decision to use or reject material can be safely left with him."

What Criteria?

"What criteria would you set up in judging such material offered for use in schools?" I asked.

"Well," he replied, "the first question I would ask is: 'does it fit in with modern educational tendencies?' If it does not, it can serve no useful purpose and should be rejected by the authorities, no matter what its source may be. Present day methods of teaching such fundamental subjects as Geography, History, Civics, English and Popular Science are quite different from those of 40 or even 20 years ago. Educators realize that there is a great deal more to Geography than the mere geographical location of cities, states, nations and continents; the History must take into consideration present day conditions and show how they have come about instead of being confined to a mere chronology of events; that Civics is not solely a matter of government, but must include political, social, and industrial economics; that English can be taught in such a way that the pupil will learn many other things; and that Popular Science has been broadened in scope to an extent not dreamed of a generation or two ago.

"One finds in progressive school systems everywhere," he continued, "these fundamental subjects being taught by the use of so-called supplementary readers, which in turn are supplemented with suggestions for further reading. These supplementary readers seem to deal with almost every subject except the one being taught, but, if the text is examined carefully, it will be seen that they teach the subject in a far better way than the old-fashioned text book. For example, a favorite method of teaching the History and Geography of the United States is by means of a reader on the subject of the development and progress of industry in the United States.

Examine the Material

"Then, if I should find that the material does fit in with the modern scheme of public school education, I would examine it from a standpoint of substance; its accuracy, quality, and the ideas which it presumably will instill in the minds of both teacher and pupil. If I found it to be accurate, up to date, well-organized, written in an interesting style and concerning a subject which would not only be of interest to the pupil and teacher, but a subject which both should know something about, I would then inquire into the ideas which it might instill in the minds of both. If it should contain the slightest suggestion of advertising the products of some particular concern, or if it preached any political creed, social philosophy, or industrial policy, I would reject it."

"Just what do you mean by advertising the products of 'some particular concern'?" I asked.

"Well," he replied, "I see no reason why children should not be taught the beneficial results of eating plenty of breakfast food, or drinking plenty of milk. I see every objection, however, to teaching them that some particular brand of breakfast food, or milk, is better than all the others. Or, in the case of banking, there is no reason why a banker's association should not furnish material instructing children about the fundamental principles of banking, and attempt to instill in their minds ideas of thrift. I would see every objection, however, to material which in addition to this, would urge that some particular bank in the community offers better facilities for saving than any other bank. In other words, I draw a sharp line between what we might call informational advertising and direct advertising.

Need for Additional Instruction

"I would then inquire as to whether there were any need for additional instruction in the subjects involved. Now, it frequently happens that text books on certain subjects, such as Civics and Economics, designed for use in junior and senior high school, must cover a broad field in comparatively small space. For this reason they can only touch on such subjects as transportation, communication, light and power and water supply. Yet certainly, in this day and age, no intelligent person can have the temerity to suggest that children in junior or senior high schools should not be given as much instruction as possible in these most important subjects.

"This instruction should not be confined simply to present day conditions, but should go as far as possible into the history of these great public services, show something of their development and progress, and, above everything else, describe their influence and effect on the social and economic life of the nation. The education of a large proportion of our school children ends with graduation from a senior high school. If they are to be fitted to meet the many problems of our complex civilization which those who must earn a living are called upon to face, such instruction is of paramount importance. This is particularly true when the instruction does not add to the curriculum, but only supplements instruction in what is known as fundamental subjects."

"That is all very well," I said, "but why cannot sufficient instruction in these matters be included in the text of these supplementary readers or in books on Civics and Economics? Why should the industries feel called upon to go to the expense of furnishing this class of educational material, when, as you say, it is instruction which the schools should give?"

"Your question is a perfectly proper one, but not altogether any too easy to answer," he replied. "The obvious answer is that the average text book in use today doesn't. This, of course, is not altogether the fault of the author. As I have tried to point out, he has to cover a wide field in a limited space. In the second place, it is hardly fair to expect the average teacher or college professor—and most of these text books are written by either high school teachers or college professors—to have an intimate working knowledge of the economics of street railway transportation, or the telephone and telegraph business, or the operation of a light and power plant, or the intricacies of their financial structures. In fact, there are many of them who don't know the difference between the control and regulation of a utility by the provisions of its municipal franchise and control and regulation by means of public utility laws administered by a state commission. I could show you a dozen text books dealing with these subjects that are entirely obsolete insofar as these matters are concerned. The authors are dealing with situations as they existed 20 or 25 years ago.

"Please don't misunderstand me. I don't mean that pupils in the public schools should have their heads filled up with all of the thousands of details concerning these businesses. And sometimes I think that the reason why these text book authors only play around the edges is that they think they cannot deal with them unless they include all the details, and this would occupy all of the space in their books. I do think, however, that there are certain broad fundamental principles concerning them which should be taught to every child who is not going to have the benefit of a college education.

"And so," he concluded, "we are facing a condition of fact, which is that our teachers are not being provided by the text book authors and publishers with factual information about these great influences on our daily lives. It is only natural that they should be receptive to the suggestion that this information be furnished by those who ought to know most about it—the leaders in the industries themselves. Just as long as it is factual and contains no propaganda—using the word in its most offensive sense—I can see no objection to it."

"What is the difference between the kind of propaganda you mean and educational material?" I asked.

"I can only say that in my opinion propaganda is the sort of material which appeals to the emotions and educational material is that which appeals to the intellect. And I am not so sure but what that is a perfectly good yardstick when looking at material for use in the public schools."

An Association Periodical That Gets Results

By Maude Buchanan

Editor's Note: The Editor of the Bulletin feels it incumbent to protest that he is not in agreement with Miss Buchanan's wholesale indictment of Association publications, but, on the other hand, he felt that to invoke the blue pencil would destroy, the background built up to contrast emphatically the merits of the publication of which she writes. At any rate, the editor concurs fully in her main argument—that *The Nela-Graph* is a very spirited, entertaining and useful production.

Association "magazines," generally speaking, are notorious for their lack of readers. Perhaps one of the reasons is that many of them are so dignified and "high hattish" that they cease to be interesting. There is, I am afraid, very little human interest in most of them.

The association magazine is the association's house organ. And the mortality rate of house organs is very high. Of those that survive, many, alas, are lackadaisical creations without interest sometimes to even the editor.

Shortly after the Southeastern Division of the National Electric Light Association opened permanent offices in Atlanta, the Division's Executive Secretary, C. M. Kilian, felt the need of some personalizing influence to reach those members it was impossible to reach in a personal way. The Division has some 800 individual members, so it was obviously impossible to make a personal visit to each even once a year. So a divisional bulletin was decided upon, which decision in itself is neither new nor startling.

The bulletin was given the name of *The Nela-Graph*. It is different from other association publications in the following respects:

1. It does not attempt to present to its members statistical or technical editorials or articles. The reports of the association contain such data and are available for any members interested.
2. It strives to maintain a spirit of rivalry between individual members and companies in the same manner as rivalry is stimulated between individual members of sales organizations.
3. It keeps before the executives of the companies comprising its membership the value of participation in association activities by placing before them concrete benefits of such participation.
4. It is entirely unorthodox in its make-up, typography and grammar. It is written as one man talks to another, and not in the bookish artificial rhetoric of most "official organs."
5. (*The Nela-Graph* is the "*unofficial* organ" of the Division.) It is profusely illustrated with cartoons, each of which ties in closely with the written text. Printer's type is not used, except in the reproduction of some articles quoted from some other publication. Copy for the issue is written on the typewriter, with illustrations sketched or pasted in, and the bulletin is then photo-lithographed.

The Nela-Graph is now in its third year. That it is widely read is evidenced by the many voluntary congratulatory letters received by the editor from presidents, general managers, publicity directors, committee chairmen and members; by numerous requests from those outside the circulation field of *The Nela-Graph* to be placed upon the mailing list; by inquiries as to what method is used in editing it; by requests from manufacturers for advertising space (it carries no advertising), and by voluntary contributions to its columns.

The results have been as follows:

1. As is the case with most voluntary organizations, the Southeastern Division of the National Electric Light Association functions through committees. At the time the divisional offices were established, not many of the executives of member companies were sold on the value of committees, and difficulty was experienced in getting the personnel with which to man the committees. This negative attitude on the part of executives has entirely disappeared, and men of high caliber are now readily made available for work on committees.
2. There was difficulty in getting acceptances of committee appointments. Such appointments were looked upon as more or less empty honors. This attitude has been dissipated and the Executive Secretary now receives voluntary requests for appointment on committees by executives and others.
3. The attendance at the annual conventions is now three times greater than at the time of the first issue of *The Nela-Graph.*
4. Its spirit of good-nature, subtle compliments, friendly irony and readable news have unified the thought of the rank and file of its members to the extent that an *esprit de corps* in the Division has resulted which is perhaps unequalled in any voluntary organization.

Mr. Kilian, its editor, attributes its effectiveness to the fact that its contents seem human and, therefore, quite a radical departure from the usual outpourings of statistics, technique and boiled-shirt wisdom so common in many association periodicals.

U. S. Department of Agriculture

FARM POWER SURVEY Full of Facts

By C. M. Ripley

General Electric Co., Schenectady

THE United States Department of Agriculture Bulletin No. 1348 is one of the most fascinating bits of reading—because it answers so many difficult questions.

Those printed below are but samples of the kind of information contained in this wonderful booklet.

The 30 per cent of 16 billion horse power hours bought at 5c. per kw.-hr. plus a reasonable estimate for electric light and other household uses would indicate that the 6½ million United States farms could spend approximately one million dollars a day for electricity with economy to themselves, added comfort to their families and increased output from their properties.

That Uncle Sam is in accord with the farm electrification movement will be inferred by the following extract from the foreword in the booklet:

"Agriculture in the United States uses practically as much primary power as all manufacturing and central station plants combined. The cost of using this power amounts to approximately three billion dollars for the year 1924.

"However, by the aid of this power the average agricultural worker has been able to *increase his volume of production nearly three times over the average of 75 years ago.*

"Power and labor together represent on the average about 60 per cent of the total cost of carrying on the farm business, and since these are two items directly subject to the control of the farm operator, *great opportunities exist for cutting down production costs through a better understanding of the power requirements of farm operation, through the adoption of more efficient and less expensive types of power units, and by a more extensive use of power to replace human labor.*"

The above far-visioned statement was signed by H. C. Taylor, Chief of the Bureau of Agricultural Economics; by E. W. Sheets, Chief of the Animal Husbandry Division of the Bureau of Animal Husbandy, and by Thomas H. McDonald, Chief of the Bureau of Public Roads, who together constitute the Department's committee on farm power.

And the very first paragraph of the book itself is equally inspiring, as follows:

"The adoption of labor-saving machinery, *made possible by the extensive use of power,* has been universally acknowledged as the outstanding feature of American agriculture during the past three-fourths of a century. Seventy-five years ago the average agricultural worker could care for about 12 acres of crops; now, considering the United States as a whole, he can attend to at least 34 acres, and in some States where large power units are found, the average is more than 100 acres, while on many individual farms it will run as high as 300 acres or more. At the same time the workers' hours have been considerably shortened and much of the drudgery and monotony of farm work has been eliminated."

Then follows 52 pages of text and charts of a remarkably exhaustive character, and about 20 pages of ap-

QUESTIONS	ANSWERS
1. What is the cost to the average farmer for one hour's work of one horse or one mule?	**25c. (Line 5, column "B"):**
2. What is the cost of one horsepower for one hour, when furnished by electricity?	**5c if provided by a large central station (line 5-L) 15c from a small central station (line 5-K) and 25c if made in your own farm electric plant (5-J).**
3. What does it cost for the same amount of power furnished by a windmill?	**5c. (line 5-i).**
4. Do the above costs include overhead?	**Yes, but not the cost of the operator. (And a horse needs a driver, but a motor does not.)**
5. What does it cost for one horsepower for one hour when provided by other kinds of power?	**From 4 to 20c. See line 5 on chart.**
6. What do the U. S. farmers pay every year for horse and mule power?	**2½ billion dollars.**
7. What percentage is that of the total power cost?	**81 per cent of the cost (7-b), but they do only 61 per cent of the work (7-b and 9-b).**
8. What kind of stationary farm power works the longest hours at full capacity?	**Electric power from large companies works 1200 hours per year average (10-e).**
9. What kind of stationary farm power works the shortest hours at full capacity?	**Power from belt of tractor works 88 hours per year (10-c).**
10. What are the two most expensive kinds of power?	**Work animals and private electric plants. Each costs 25c per hp. hour average (5b & j).**
11. What are the two cheapest kinds of power?	**Electricity from large central stations (5-e) and large stationary engines over 5 hp. (5-g) cost 5c and 4c. per hp. hr. respectively.**
12. What is the total cost and the average cost of all kinds of farm power?	**3 billion dollars a year for 16 billion hp. hrs. This is an average of 19c per hp. hr. or the equivalent of 25c per kw.-hr.**
13. Why is the average of 19c so close to the maximum of 25c?	**Because so many farms are using expensive power.**
14. Of the present 16 billion horse power hours used on U. S. farms annually, what percentage can be efficiently electrified now?	**30 per cent.**

POWER ON U.S. FARMS

EXCEEDS 47 MILLION HORSE POWER!
COSTS 3 BILLION DOLLARS A YEAR!
DOES 16 BILLION H.P. HOURS OF WORK YEARLY!

1924 DATA FROM
U.S. DEPT. OF AGRICULTURE
BULLETIN 1348
REARRANGED BY C.M. RIPLEY

	Kinds of Power on Farms →	HORSES, MULES, OXEN	GAS TRACTORS		STEAM DRIVEN TRACTORS	GASOLENE MOTOR TRUCKS	STATIONARY ENGINES		WIND-MILLS	INDIVIDUAL ELECTRIC PLANTS	PURCHASED ELECTRICITY		(Note: Installations Increased to over 400,000 by 1928)
1			Power From Belt	Power For Pulling			Over 5 H.P.	5 H.P. or Less			From Small Electric Cos.	From Large Electric Cos.	
2	Number Used	20,770,000	400,000		50,000	356,000	20,000	2,480,000	1,000,000	300,000	200,000 Installations	20,000 Installations	
3	Total Horse Power of Each Kind	19,800,000 H.P.	8,000,000 H.P.	4,000,000 H.P.	2,500,000 H.P.	7,120,000 H.P.	500,000 H.P.	6,800,000 H.P.	500,000 H.P.	900,000 H.P.	800,000 H.P.	500,000 H.P.	Total 47,420,000 H.P.
4	Work Done Yearly by Each Kind of Power	9,700,000,000 H.P. Hours	700,000,000 H.P. Hours	900,000,000 H.P. Hours	1,000,000,000 H.P. Hours	600,000,000 H.P. Hours	500,000,000 H.P. Hours	1,500,000,000 H.P. Hours	200,000,000 H.P. Hours	150,000,000 H.P. Hours (Input Only)	150,000,000 H.P. Hours	600,000,000 H.P. Hours	Total Work Done Yearly = 16,000,000,000 H.P. Hrs.
5	Cost of 1 Hours Work of 1 H.P. of Each Kind	25¢	6¢	12-1/2¢	6¢	20¢	4¢	8¢	5¢	25¢	15¢	5¢	Average Cost of All Kinds of Power = 19¢ per H.P. Hr.
6	Yearly Cost of Each Kind of Power	$2,425,000,000	$42,000,000	$112,000,000	$60,000,000	$120,000,000	$20,000,000	$120,000,000	$10,000,000	$38,000,000	$23,000,000	$30,000,000	Total Cost of All Power per Year $3,000,000,000
7	What Proportion of Total Expense Each Kind Costs	81%-	1%+	4%-	2%	4%	7/10 of 1%	4%	3/10 of 1%	1%+	1%-	1%	
8	What Proportion of Total Power Equipment Each Kind Is	42%-	17%-	—	5%+	15%	1%	14%+	-1%	2%-	2%-	1%	
9	What Proportion of Total Work Each Kind Does	61%-	4%+	6%-	6%+	4%-	3%+	9%+	1%+	9/10 of 1%	9/10 of 1%	4%-	
10	Hours per Year Each Kind Works Full Capacity	490 Hours	88 Hours	225 Hours	400 Hours	80 Hours	1000 Hours	220 Hours	400 Hours	167 Hours (Input Only)	190 Hours	1200 Hours	Each H.P. on the Average Works Full Capacity 320 Hrs. Yearly
11	Average Horse Power of Each	95/100 of 1 H.P.	20 H.P.	10 H.P.	50 H.P	20 H.P.	25 H.P.	2-3/4 H.P.	1/2 of 1 H.P.	3 H.P.	4 H.P.	25 H.P.	

pendix containing tables, explanation of methods of cost figuring and a bibliography.

The figures are for 1924, and do not show the recent improvements in farm electrification. Commercial executives can easily contrast the progress they have made in farm electrification against the situation in 1924 averaged for the whole country. Doubtless this would be inspiring to power salesmen who are developing the farm load.

And the advantage of being able to point to government figures which prove that the farms are now using expensive power, makes it easy to demonstrate the great economy of electric service. This government booklet flatly states that *large* central stations sell electricity *at 1/3 the price of small stations.* This should show the farmer that he benefits when small utilities combine with each other to make larger companies, for he then obtains not only lower rates, but standardized electricity, more reliable service and a higher type of engineering recommendations.

This booklet deserves study on the part of the commercial men and is well worth having in the library.

A Motion Picture

portraying

INDUSTRIAL ELECTRIC HEATING

How many times have you wanted to take an electric heating prospect into plants around the country where you could show just what electric heat is doing? Now—better than that—you can bring these plants right to your prospect, and there in his own town he can take a trip through industries all over the country.

How? MOTION PICTURES. The National Industrial Heating Committee of the N. E. L. A. has made a five reel motion picture film covering the fields of heat-treating, enameling, steel melting, etc. Here you have the latest applications taken in nineteen different plants to put right before your industrial customers—those who are direct prospects as well as that greater number who should be impressed with the importance of electricity in the heating field. This is an industrial men's film. Stripped of non-essentials, designed to do one thing: Promote electric heating.

The film can be bought outright or rented. Complete information on the film, including description of scenes in the film and purchase and rental prices, may be secured from Mr. H. J. Hall, Detroit Edison Co., Detroit, Mich.

INDUSTRIAL HEATING COMMITTEE

Westinghouse Engineering Developments in 1928

By F. C. Hanker

Mr. Hanker is Manager of Central Station Engineering for the Westinghouse Electric and Manufacturing Company.

In the field of major apparatus there have been made during the year numerous advances to keep pace with the demands of the industry. In the past it has been the custom to refer to the "largest this" or "most efficient that" so often that the expressions lose their force. A review is of interest, however, in fixing landmarks in the expansion of the industry, and some of the achievements are mentioned to indicate their importance in the trend of development.

Steam Electric Stations

In the field of the steam electric stations there have been some interesting units installed during the year. The largest of these is the 164,000 kw. unit being installed in the Hellgate Station of the United Electric Light & Power Company, New York. This is a cross-compound unit consisting of a high pressure element and a low pressure element, each direct-connected to generators of 80,000 kw. Each main generator has a rating of 94,200 Kv-a., 60-cycle. An exciter for both machines is directly connected to the high pressure unit and a 4000 kw. house generator is connected to the low pressure unit.

Other important units are the ones installed in the Hudson Avenue Station of the Brooklyn Edison Company, which is also a cross-compound turbine of a total capacity of 110,000 kw. in the two elements, each of which is 55,000 kw., and the 60,000 kw. single cylinder single-flow unit supplied to the Milwaukee Electric Railway & Light Company.

Higher Pressure Units

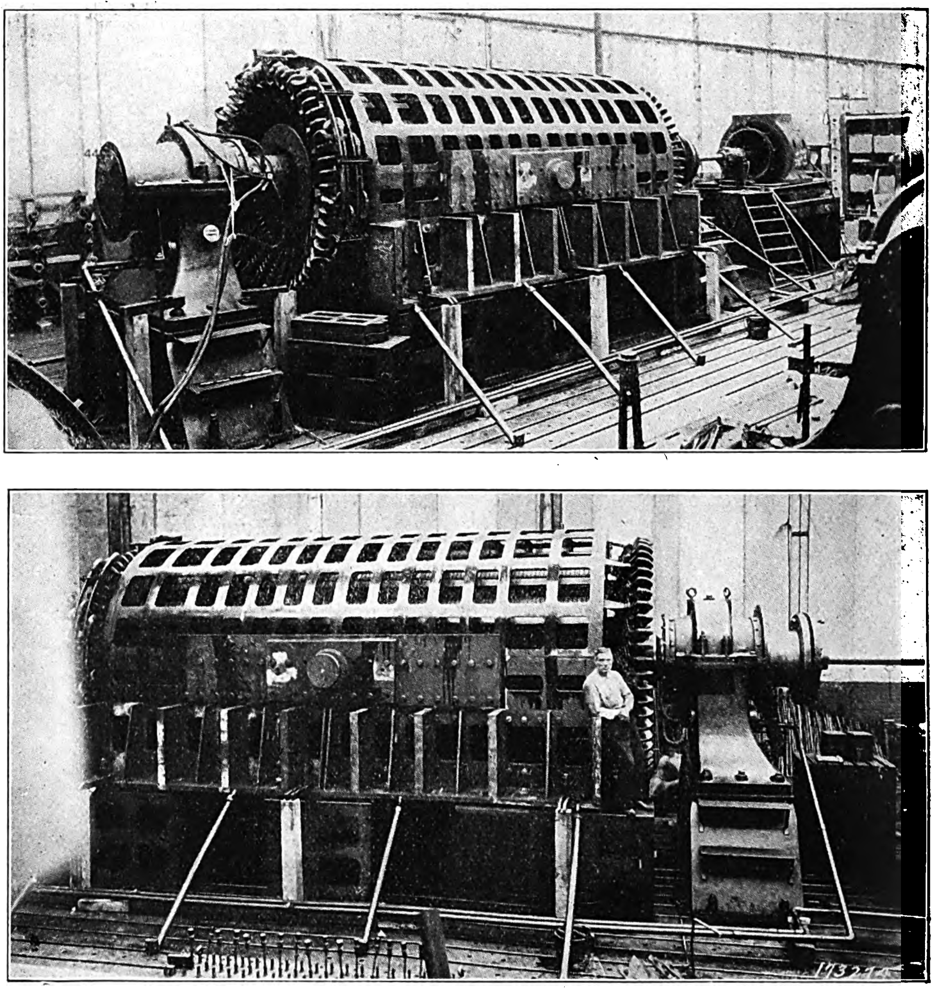
In the field of high pressure units there has been installed in the plant of the Kansas City Power and Light Company a 10,000 kw., 3600 r.p.m. unit operating with a primary pressure of 1200 lb. and a back pressure of 365 lb. This unit is interesting in that it is an example of the use of a high pressure element in the rehabilitation of existing plant. This arrangement permits the use of units already installed and increases the plant efficiency without involving the obsolescence of present investment.

One of the important advances in the turbo generator field is the development of a double entry centrifugal fan that reduces the entrance loss and provides units of large volume capacity and exceptionally high efficiency at the speeds of 1800 r.p.m and 3600 r.p.m This is of particular importance in view of the limitations in rotor diameter which restricts the area for cooling air between the shaft and the fan.

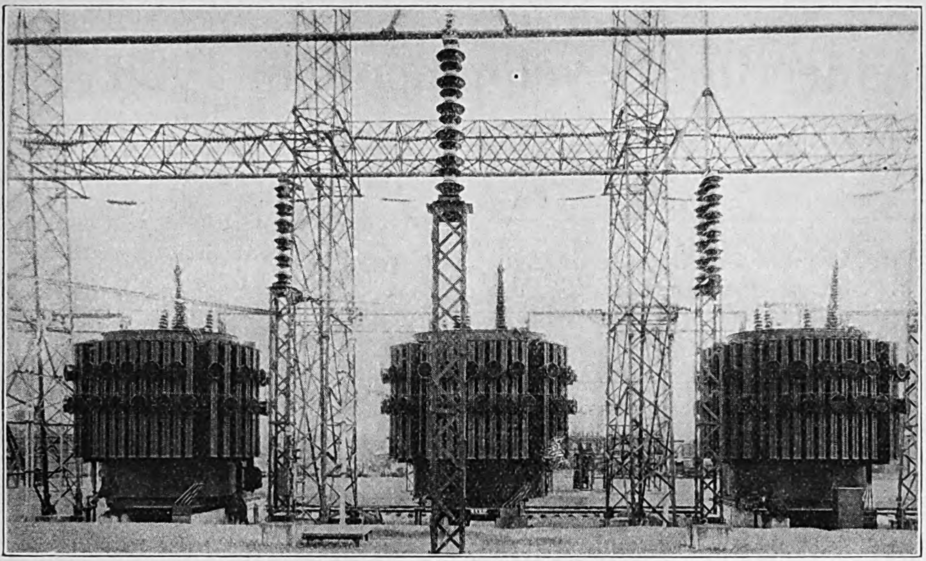
Hydro-Electric Field

In the hydro-electric field there have been several important installations in the East and Southeast of large capacity units. The Conowingo Station of the Philadelphia Electric Company was placed in commercial service during the year and is probably the most outstanding achievement in that field. The station, containing initially seven 36,000 kw. units (ultimately eleven units), is the second largest in the country, being exceeded only by the Niagara Falls Power Company station. The generators are of 40,000 Kv.-a. capacity operating at 82 r.p.m and are physically the largest that have been built. The output is transformed to 220,000 volts for transmission to the Philadelphia district.

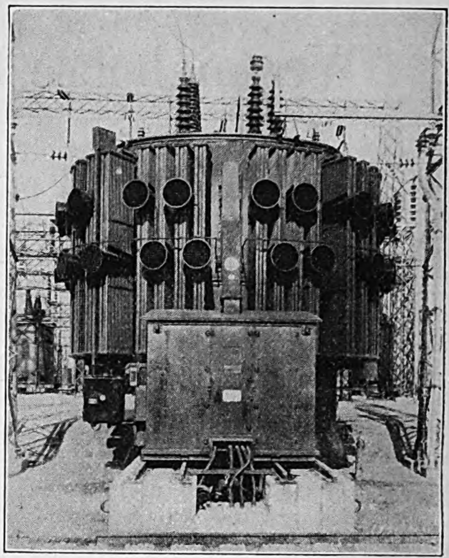
Another interesting development in this field is the completion of the Lock 18 Station of the Southeastern Power and Light Company. This station contains four units of 25,000 kw., operating at 100 r.p.m. The generators are 29,000 Kv-a capacity and the station forms one of an important group



Shop views of the 94,000 Kv-a. Hellgate Station turbo-generator



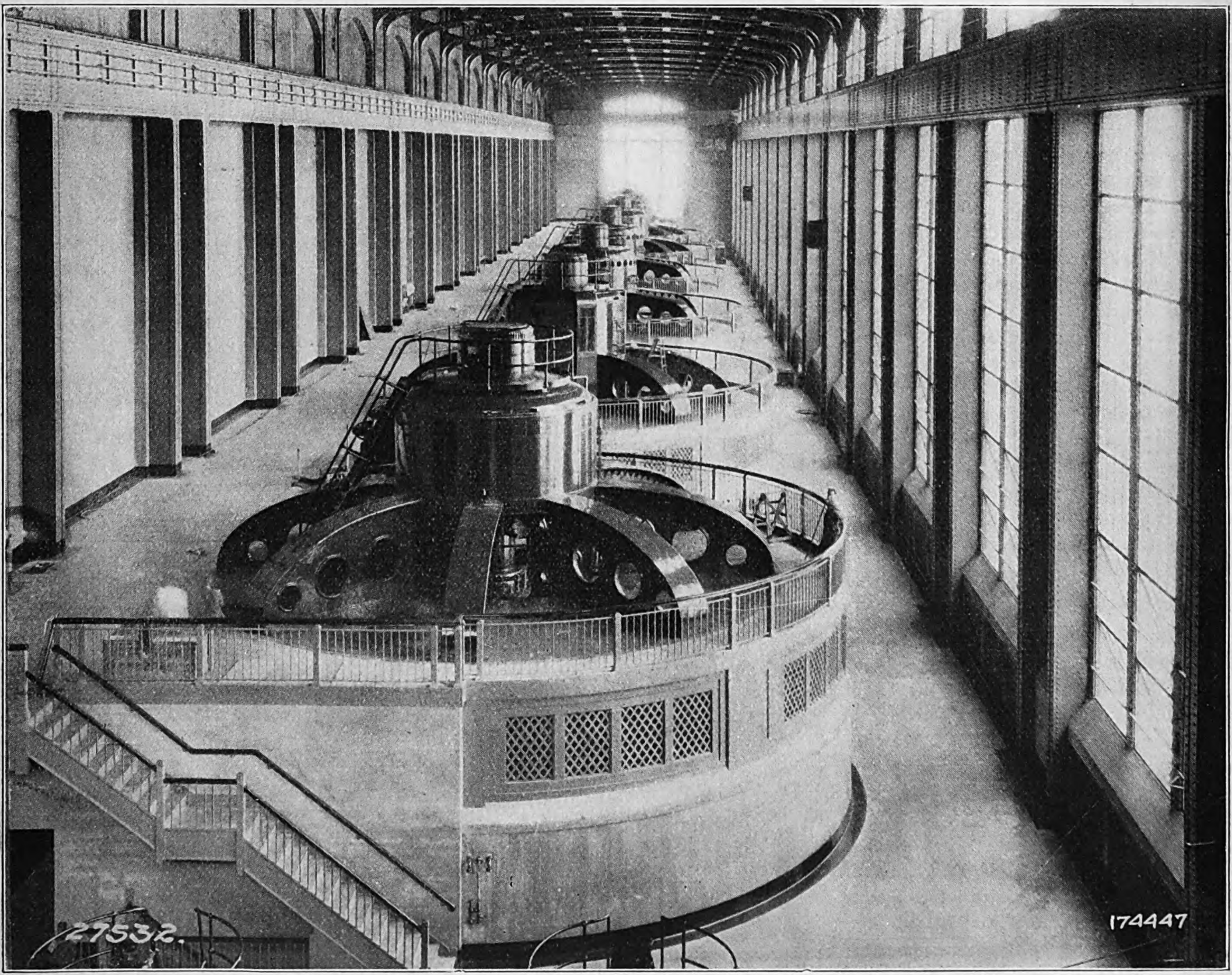
Transformer Bank at Plymouth Meeting



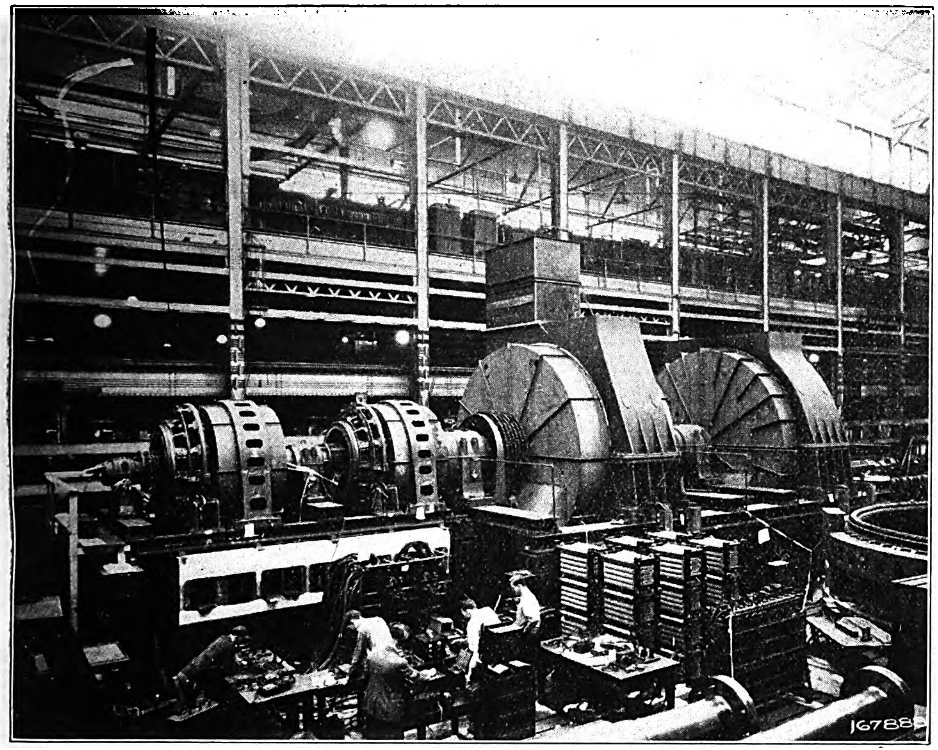
One of the Plymouth Meeting transformers showing tap changing mechanism

of hydro-electric developments in the Southeast.

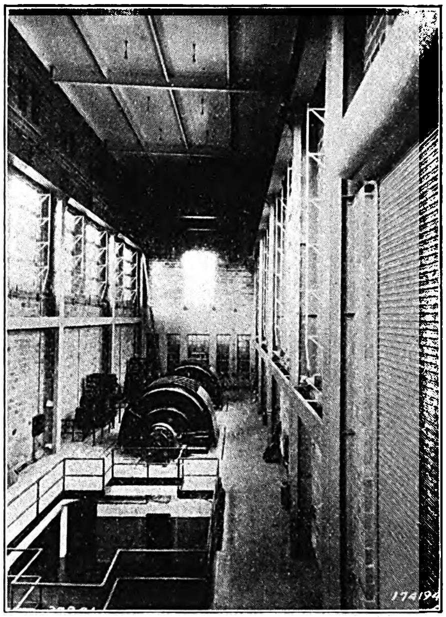
The excitation system in the Conowingo and Lock 18 Stations are of the quick response type and represent recent developments in improving system stability through their tendency to maintain internal voltage conditions in the generator. It is now



View of the Conowingo generators installed



Niagara, Lockport & Ontario Power Co. frequency changer on test



Installation view of the 30,000 Kv-a. synchronous condensers for Philadelphia Electric Co. and Consumers Power Co., 98.25 per cent efficient

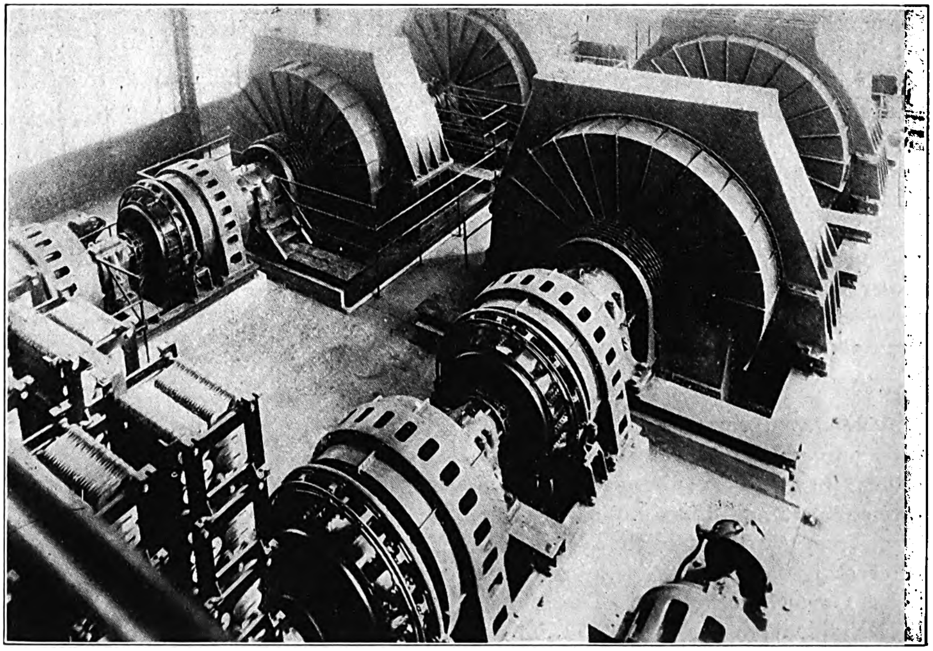
recognized that improved voltage conditions on synchronous apparatus during disturbances improve the synchronizing characteristics and system operation. In the past it has been difficult to design direct coupled exciters with satisfactory speed of voltage response. In these installations the conventional type of direct connected exciter was discarded and direct connected house generators furnishing an auxiliary bus were provided. These furnish supplies independent of the external system for the operation of motor-driven exciters giving a reliable source of drive for the excitation units unexposed to system disturbances.

Improvements in Rotating Apparatus

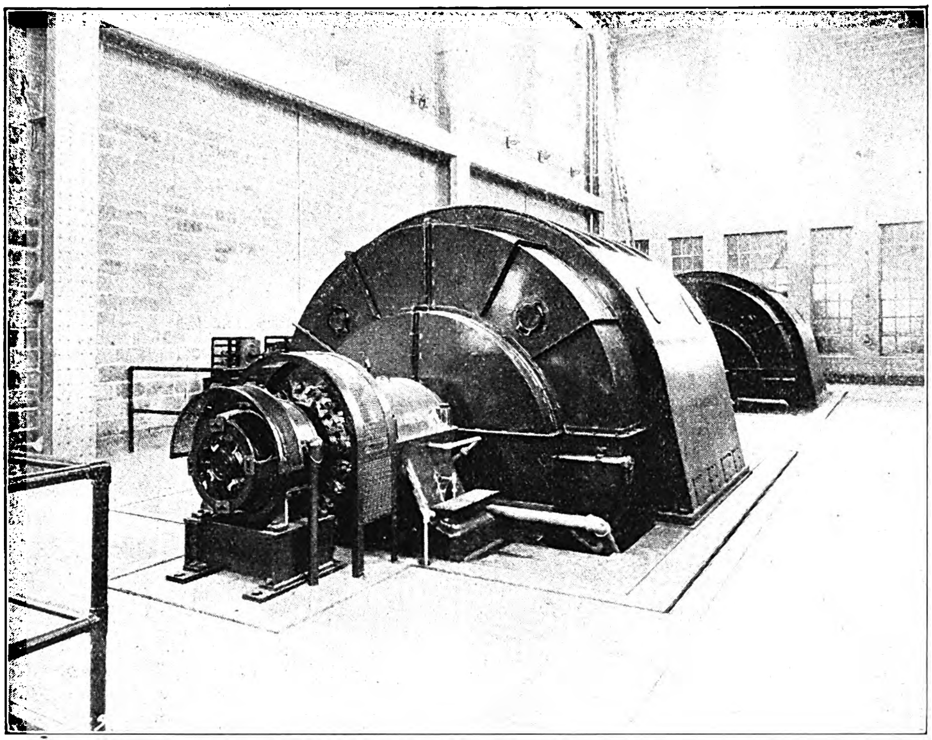
An outstanding achievement in connection with rotating apparatus has been the application of fabricated materials and welding to various lines. Standard lines of direct current generators and motors, alternating current generators, synchronous motors and synchronous condensers are now completely structural in both stator and rotor. The stationary parts of the larger synchronous machines, both waterwheel and turbo types, are of fabricated material. In the case of large turbo generators, this permits designing of the frame in such a way that much larger capacity units can be built up in the factory without exceeding shipping limitations in both dimensions and weights. The external sheet metal housing is assembled on the frame after erection to provide proper air passages for the ventilating system.

Conversion Apparatus

In the field of conversion there has been an important advance in the development of variable ratio frequency changer sets. The use of two frequencies, 25 cycles and 60 cycles, in certain portions of the country, has made it desirable to install interconnecting capacity for power interchange. These system capacities in recent years have increased so rapidly that in some cases it is not economical to install sufficient frequency conversion apparatus to insure satisfactory interconnected operation of the systems with the rigid synchronous - synchronous type of unit. In the case of the Niagara systems, the amount of power they desire to interchange was not sufficient to justify the use of the required capacity in synchronous-synchronous sets, and the variable ratio tie was provided. Two 25,000 Kv-a., 300



Two 25,000 Kv-a. 25-60 cycle, variable ratio, frequency changers installed by the Niagara, Lockport & Ontario Power Co.



Installation view of the 30,000 Kv-a. synchronous condensers for Philadelphia Electric Co. and Consumers Power Co., 98.25 per cent efficient

r.p.m., 25-60 cycle, variable ratio frequency converter equipments were installed at the Hinman Road Station of the Niagara, Lockport and Ontario Power Company. This development represents a large step in advance of previous units, being three times as large as any previous variable ratio set built in this country.

Synchronous Condensers

Considerable advance has been achieved in the construction of synchronous condensers for higher speeds, lower weights and reduced floor space. At the same time there has been a very considerable reduction in the total losses. In the past fifteen years, on units of 15,000 Kv-a., the speed has been increased approximately two and one-half times, whereas the losses have been reduced from the order of three and one-half of rating to approximately 2 per cent of rating. This illustrates the progress in permissible speed and the reduction in operating losses.

Transformers

A number of large transformers have been built during the year which show steady progress in design and performance rather than radical departure from well established practice. Interesting large units were required in the Conowingo project. These have an individual rating of 33,333 Kv-a., single phase, 60 cycle, without auxiliary cooling means, and of 43,333 Kv-a. through the addition of lower units on each radiator. These transformers are of the 3-winding type, one of 220,000 volts, one of 66,000 volts, and one of 13,000 volts for the supply to synchronous condenser regulating equipment. These units were provided with tap changing under load equipment and are of the Inertaire type.

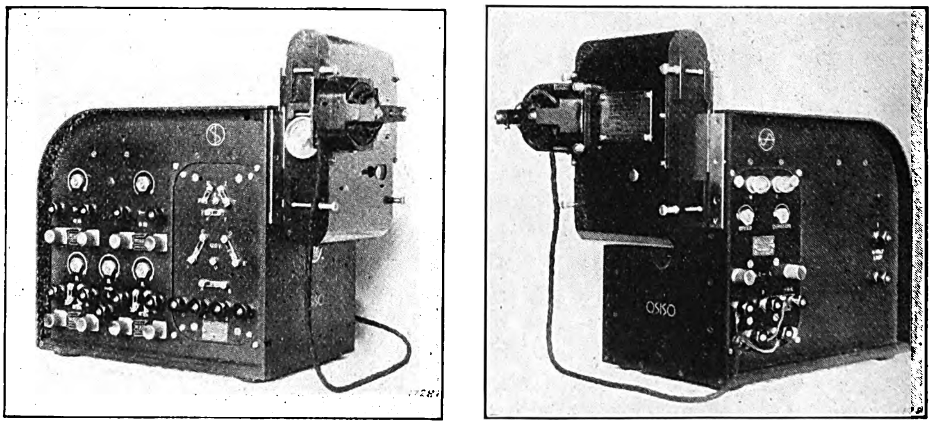
A new type of radiator for self-cooled transformers has been developed during the year and is interesting in that the elements are manufactured by expanding with air pressure after the plates have been welded together.

Interrupting Devices

The increase in capacity of systems has necessitated active research and development work on interrupting devices. In the field of large high tension oil circuit breakers notable advances have been made in the design of large capacity high voltage equipment required for the 220 kv. network now being introduced in the East. The importance of active research and development on interrupting devices is fully recognized by the manufacturers and their facilities for fundamental study are being materially improved. The Westinghouse Company is providing testing units of 100,000 kv.-a. capacity, which in conjunction with a transformer substation will permit of testing units from the lower capacities and lower sizes to the highest voltages now in use—that is, 220,000 volts. The research work that has been carried on by the company has resulted in the development of new methods of interrupting fault circuits that will soon be placed in commercial service.

Automatic Oscillographs

One of the major problems of the operating engineer is in the system layout and scheme of operation. At the present time there are several methods in use and it is important that the utilities actively participate in the collection of fundamental data relative to the operation of present systems so that they will be in a position to determine the characteristics that would be applied to the expanded systems of tomorrow. Adequate recording equipment has been developed during the past few years giving the operating engineer the tools to study the operation of the system during disturbances that he did not formerly possess. The automatic Osisos and multi-element oscillographs represent a distinct achievement in recording apparatus.



Two, three and four element automatic oscillograph for recording disturbances on power systems
Right—Automatic control panel; Left—Terminal board panel

Design of High Voltage Outdoor Substations

PART II

COMMONWEALTH EDISON COMPANY

B. G. JAMIESON

A series of six discussions on design of outdoor substations originally presented at a meeting of the 1926-1927 Electrical Apparatus Committee, Engineering National Section, H. R. Woodrow, chairman. The meeting at which these discussions were presented was conducted by the Substations Subcommittee under the chairmanship of R. A. Hentz.

Substations discussed in this series are: The Philadelphia Electric Company, by Raymond Bailey; Detroit Edison Company, by S. M. Dean; (December, 1928) Commonwealth Edison Company, by B. G. Jamieson; Pacific Gas & Electric Company, by B. D. Dexter; (this issue) Duquesne Light Company, by G. Sutherland; Alabama Power Company, by L. M. Smith (next month).

Safety

ON account of the concentration of power, the factor of safety should be carefully considered, particularly in view of the past acceptance of the outdoor location as a guarantee of safety. Instances of spread of trouble due to large volumes of oil and unlimited supply of oxygen together with the absence of barriers indicate that there is danger in relying to too great an extent on the mere factor of outdoor location without other safeguards.

System Stabilizing and Regulating Equipment

The frequent occurence of overhead and underground junctions of primary systems which must permit flow of power in more than one direction, which must be safe from the effects of lightning and which must have elements of stability that will enable service more reliable than that obtained from single generating centers calls for a design which is liberal in the extreme. There must be allowances for apparatus to control or absorb wattless current, to limit extreme voltage range either under full load or no load conditions, and for relief from excess static voltage accumulation or transients, all with provision for adequate control.

Interrupting Capacity

Owing to the increasing size of the transmission lines and the necessity for

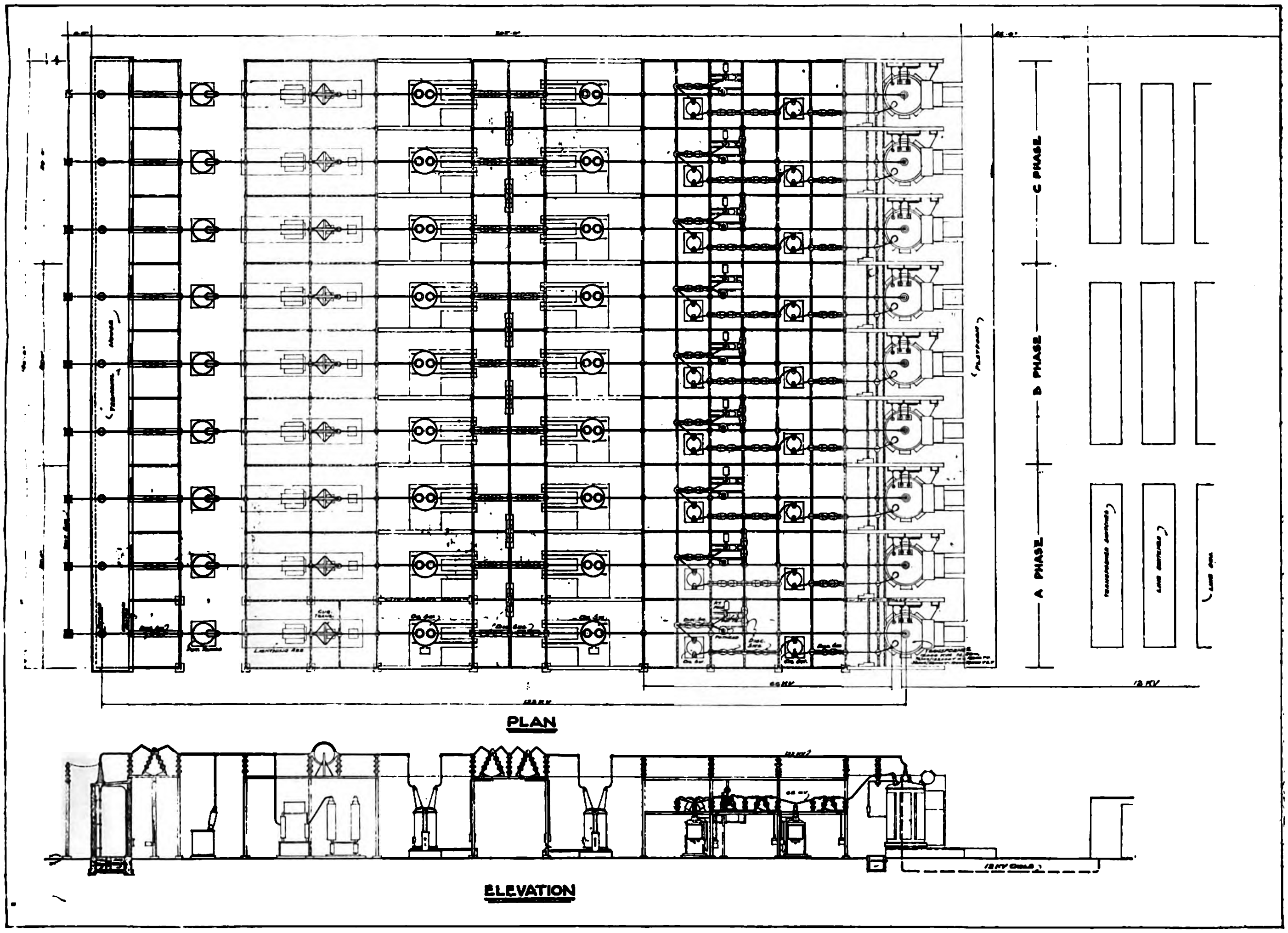


Fig. 15—High Tension Transmission Terminal—Commonwealth Edison Company

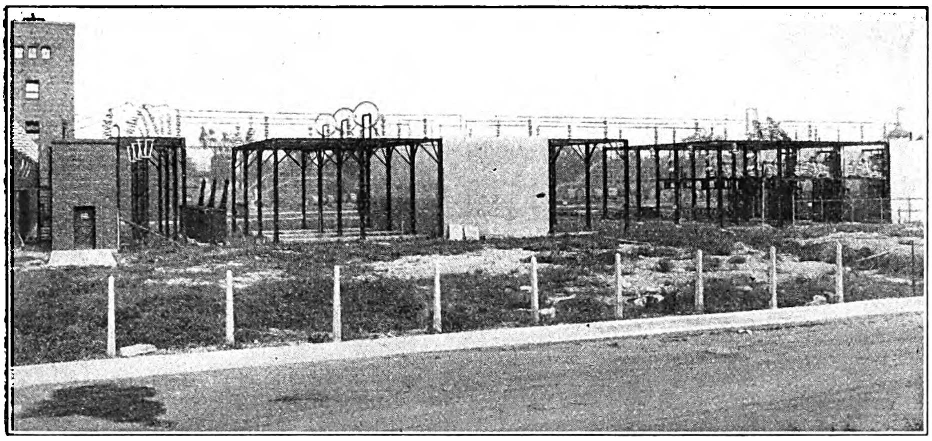


Fig. 16—Side View of Northwest Substation—Commonwealth Edison Company

interconnection, oil circuit breaker duty approaching two million kv-a. may be looked forward to. The one beneficent factor in this regard is the generally accepted assumption that arc interruption at higher voltages is less difficult than at low voltages for the same kv-a. interrupted. This advantage, however, does not obtain on the low tension side of the transformers where the energy appears with a larger proportion of amperes. It is desirable to lessen the duty on the breakers as much as possible by introducing ground resistors wherever practicable. The actual location of the breakers with respect to the vulnerable portions of the system should also be given attention, as it is desirable in the absence of barriers to protect as far as possible other vital elements of the system.

Insulation

In general the problems of insulation have been fairly well disposed of due to the considerable experience already had with the outdoor centers. There is, however, a tendency toward enclosure of conductors to a greater extent than has been the practice in the past, and as this type of electrical construction has advantages, the subject deserves attention. Care should be exercised, however, in choosing the type of covering so that in the event of there being insulation or dielectric insufficiencies proper modifications in design can be easily made without a large amount of writing-off.

Transformers

The problem of tertiary windings versus Star-Delta connections is one which is very deeply involved with the character of the service distributed from the center, the problem of relay protection and the problem of circuit breaker capacity; also with the more general factor of economy as expressed by fixed charges. If the tertiary winding can be safely accepted as a substitute for the Star-Delta from the standpoint of voltage equalization and harmonic absorption, it is then possible to get greater freedom in the matter of grounding or the establishment of neutral points. If the tertiary winding can be safely and economically used for load distribution as well as for phase balancing, the possibilities of saving in ground area otherwise required for the second bank of step-down transformers appear. If, however, the use of the tertiary winding should involve extraordinary circuit-breaking equipment by reason of the double impress of short circuit energy from the two supplying windings, there may be in this extra cost an off-setting factor to the saving of the extra transformer.

Tap changing equipment and phase shifting equipment as auxiliaries to transformers require considerable attention from the standpoint of space requirements, whether considered as external or internal or composite devices. (The function of this apparatus is, of course, properly considered under the foregoing topic, "System Stabilizing and Regulating Equipment.")

Facilities should be provided for rapid disassembly and reassembly of transformers without undue exposure to the elements, and also the problem of water supply is a considerable one as demand may reach figures of 500 gal. per minute in some cases. Attention might profitably be given to forced air cooling where water supply is a problem.

Communication Systems

The importance of these centers justifies facilities for adequate and even duplicate communication or signal systems. This may involve considerable space factor in some cases where radio is employed as with the most satisfactory form of coupling it promises to include apparatus of appreciable size.

General Structural Features

Owing to the rapid change in the potential gradient near the surface of the earth it is quite desirable to keep the structure as low as possible. For this reason as well as for reasons of economy in structure, it is desirable to avoid crossing and interlinking of buses. Until cable and encased conductors are of very much higher proved reliability, the most practicable way of eliminating the cross conductors is the use of the isolated phase system which avoids all crossing of conductors.

The low structure is, of course, also desirable from an operating point of view for tests, cleaning and other purposes. It is also clear that the low structure permits of the use of concrete in the place of steel to a greater extent than is possible with a high structure.

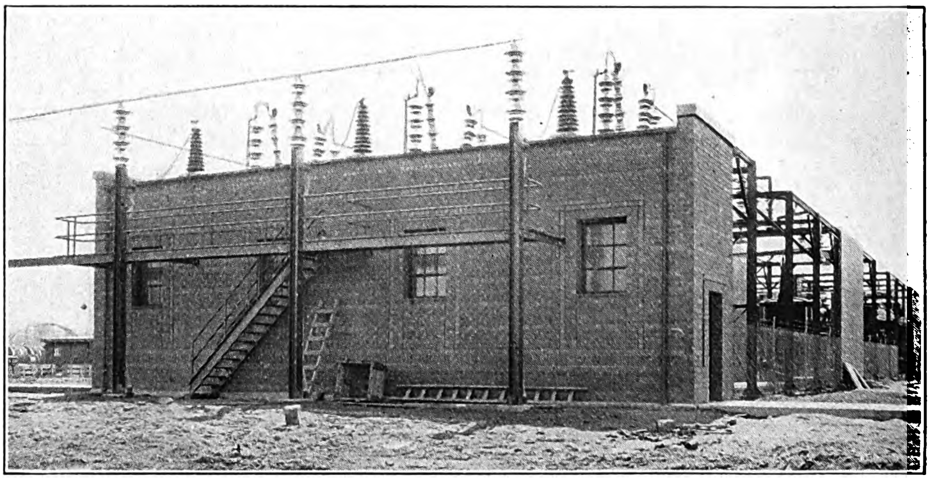


Fig. 17—Front View of Northwest Substation—Commonwealth Edison Company

Application of Above Principles in the 132 kv. Terminal Development, Commonwealth Edison Company

At the Northwest Station site in Chicago a terminal embodying the above principles has been constructed, and is now in service. The layout, as shown in Fig. 15, contemplates the following ultimate installation:

3—132 kv. cable terminals
3—Blanks of 50,000 kv-a. transformers
6—Lines at 66 kv.
32—Lines at 12 kv.
Space reservation for static dischargers or synchronous condensers.

For the sake of clearness, the longitudinal dividing walls have been omitted from this drawing, but it is readily seen how easily this construction is adapted to barrier walls between phases or between individual circuits of each phase.

Attention is invited to the following points in connection with this layout:

1. All live conductors are at minimum height from ground surface and yet sufficiently isolated by distance to provide all necessary safety for operation and construction.

2. All supporting framework is of a type that can be readily supplied from ordinary shops as it does not require stress calculations of the taller conventional structures.

3. Testing and cleaning may be done from below without hazard incident to equipment utilized for the purpose. This results from the one-level bus.

4. Buses are of minimum length and in the same plane with other conductors or branch circuits.

5. Intermediate walls or supporting structures may be erected for combined purposes of barriers and supports for emergency operations, such as lifting of parts.

6. The general low level and single plane characteristic of the conductor system make it possible to construct this type of center in locations where the high structure would be unsightly and possibly prohibitive due to lack of harmony with the surrounding buildings.

7. Conductor system may be open or closed.

8. Any experiments along the line of conductor enclosure may be made without changing the essentials of the layout.

9. Space is reserved for a ground level installation of synchronous condenser capacity with an overhead control room if and where required.

10. Connections from overhead systems may be made at either end of the development. Since the transformers are located in the center, the terminal structures at the ends may be made to take strains as required instead of acting as in the case shown merely as a cable terminal.

11. The arrangement is, generally speaking, universal with the high lines which have the better insulation at the higher levels and the lower voltage lines at the lower levels where more than two voltages are required.

NOTE: In case strict adherence to one level layout is desired, this may be accomplished by adding transformers for the third voltage with conductor system paralleling the primary system.

12. It is obvious that the space factor for group or isolated phase is the same as the major apparatus and auxiliary equipment are the big factors in the fixing of the space required.

13. The low voltage distribution units shown are factory built type embodying all elements normally required on distribution lines except the regulating equipment. Space occupied by reactors could be utilized by regulators if distribution is at 4 kv. In this case all apparatus would be outdoors except the control which would be located in the control room shown.

PACIFIC GAS AND ELECTRIC COMPANY

B. D. DEXTER

ON the high tension system of the Pacific Gas and Electric Company above 44 kv., two types of outdoor substations are employed, one known as a main line station, and the second as a distribution station. In the first case voltages are transformed from 220 kv. or 110 kv. to 60 kv., and in the second case voltages are transformed from 110 kv. or 60 kv. to 11 kv. or 4 kv. In both types of stations synchronous condensers may be installed, depending on the necessity for power factor correction.

As the designation implies, main line stations are located at points on the high voltage network where considerable amounts of power are transformed and adequate switching facilities provided. Distribution stations are placed as near as possible to the load centers of the low tension networks, or at specific consumers' plants.

In selecting property for high voltage substations, the amount varies from a usual minimum of one acre in higher priced and congested territory, to a maximum of 80 acres in the open country. In the large 200 kv. stations much space is needed for the main bus structures, connecting lines, synchronous condenser and switchboard buildings, water cooling towers, oil storage tanks, operators' quarters, garages and domestic water pumping plants.

Unlike many hydroelectric stations where the ultimate plan is carried out initially, or known to rather exact limits, the general arrangements of the substation must be laid out with considerable expansion provided, which is not usually a simple thing to do. This is due to the fact that by the time additional facilities are required new types of equipment have been perfected, conditions have changed and the original program must frequently be altered to a considerable extent; hence, it is necessary to provide ample space around all outdoor units when the station is first built.

In connection with the general arrangement of all outdoor stations of this company, attention is called to the principle of arranging, wherever possible, all structures of like character in parallel lines such as lines of terminal line towers, oil circuit breakers, bus structure, transformer banks and operating buildings. By this method extensions may be made in an orderly manner without fear of one class of equipment interfering with another. This same principle is adhered to in the condenser and switchboard buildings and permits the addition of machine bays, low tension oil circuit breaker compartments and switchboard rooms. Examples of the above method of installation are shown on the accompanying drawings of Claremont and Newark Substations.

Another feature of all substation arrangements is that the oil circuit breaker units, transformer banks and bus structures are built separated from each other. This is done for the purpose of obtaining safe clearances for workmen and to isolate equipment in order that failure of apparatus will not result in trouble being communicated to other equipment. Oil circuit breakers are usually arranged with bypass and disconnecting switches which are mounted on steel towers over the breakers.

In the main line stations where double buses are employed a single oil circuit breaker is installed on each circuit with selector switches located on

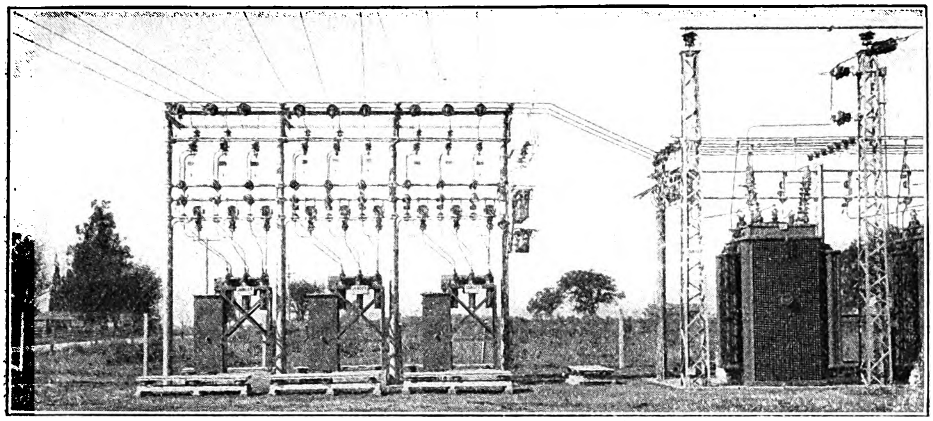


Fig. 18—Barry Substation—Pacific Gas & Electric Company

the bus structure in such a manner that a circuit may be connected to either or both buses. Where several circuits are connected to the bus, a tie breaker is usually necessary. This breaker, in addition to being useful for paralleling the buses is also put in service when a line or transformer breaker is out of service.

At the larger stations where synchronous condenser buildings are erected, transformer transfer tracks are laid between the transformer banks and the building and transformers are moved on transfer cars into the building when repairs and alterations can be made. If the substation building is not of sufficient size to permit untanking of transformers a separate transformer handling house is constructed. These structures are arranged with a pit in order that the height of the building may be kept to a minimum.

The problem of the transformer bank secondary or tertiary leads has been disposed of at the Vaca-Dixon Substation by constructing a tunnel between the 50,000 kv-a. transformer banks and the low tension oil circuit breakers, and using copper bus bars for the connections from the transformers to the breakers. This arrangement was found

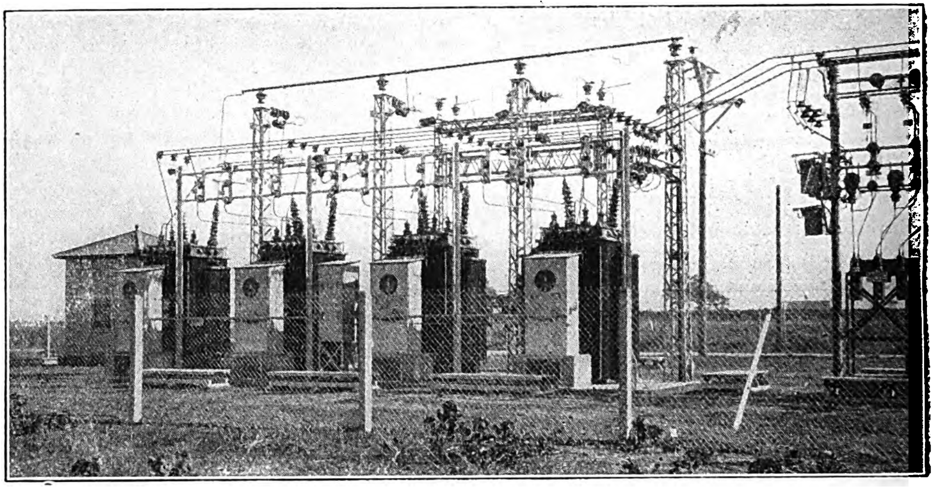


Fig. 19—Barry Substation—Pacific Gas & Electric Company

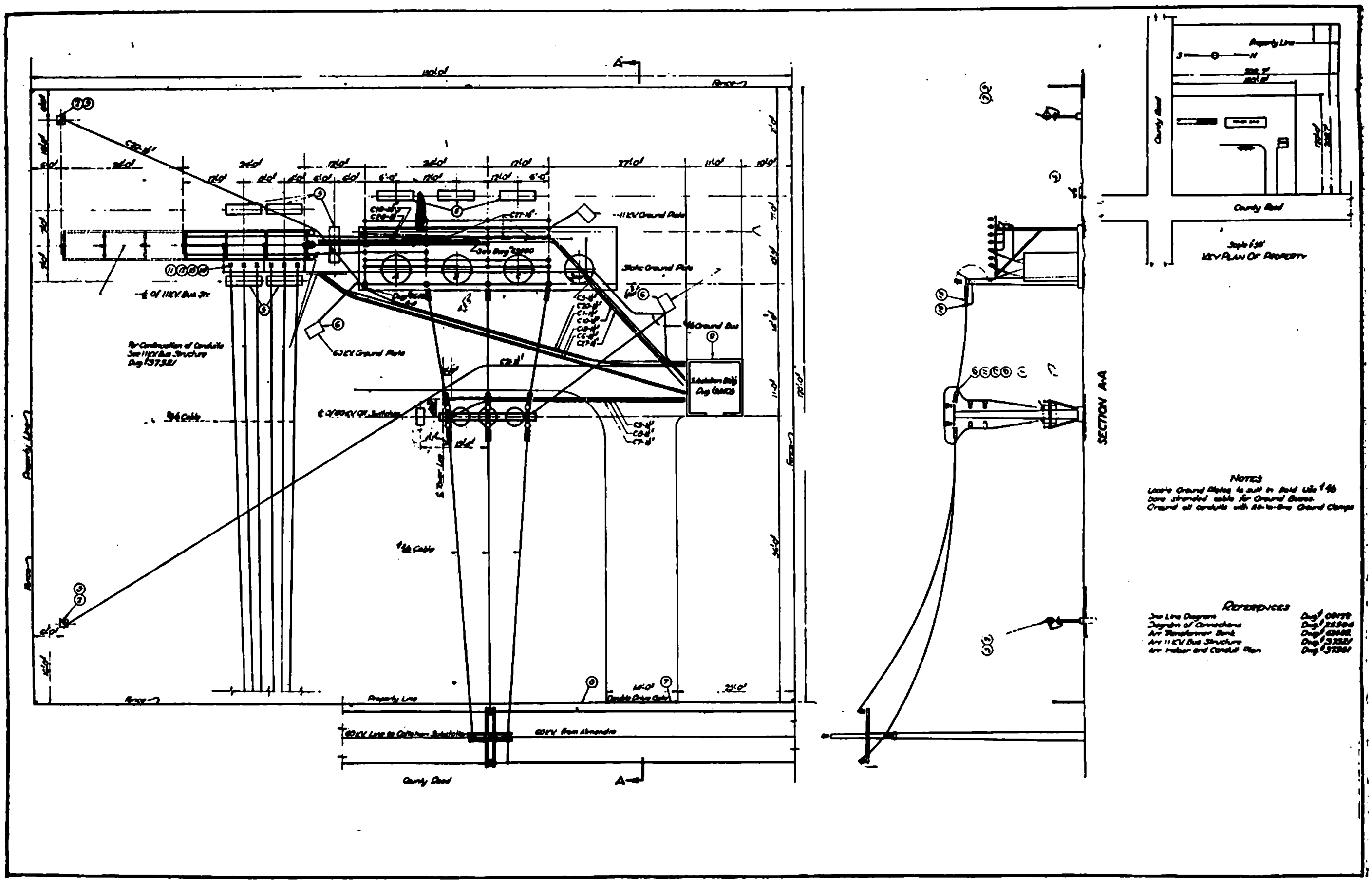


Fig. 20—General Outdoor Arrangement at Barry Substation—Pacific Gas & Electric Company

to be the most desirable due to the size and number of leads required. Starting leads for the condensers are carried in the tunnel in addition to the main tertiary leads.

At Martin Station where a 50,000 kv-a. transformer bank is installed, the secondary leads are shorter and as no starting winding is required, all connections between transformers and oil circuit breakers are made with lead covered underground cable. Attention is called to the concrete transformer secondary compartments erected at the two stations mentioned above, and drawings showing the general arrangement of these structures are shown herewith.

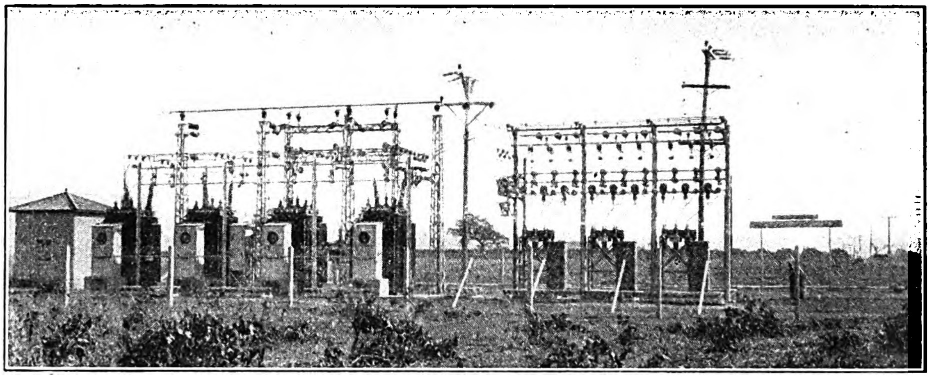


Fig. 21—Barry Substation—Pacific Gas & Electric Company

With the exception of the 220 kv. station it is the usual practice of this company to provide transfer buses and switches to cut in a spare transformer, but with the 220 kv. equipment, space requirements make this prohibitive and a damaged transformer must be moved out of place and the spare unit substituted therefor.

Illustrative of a typical rural distribution substation is the Barry Substation. The 1500 kv-a. 60 to 11 kv. transformers are controlled by means of an oil circuit breaker and protective relays are operated from bushing type transformers located in the 60 kv. breaker. Regulation at this station is obtained by use of an external tap changing switch connected to a 5 tap 10 percent regulating winding which is added to or subtracted from the main secondary winding. The tap changing

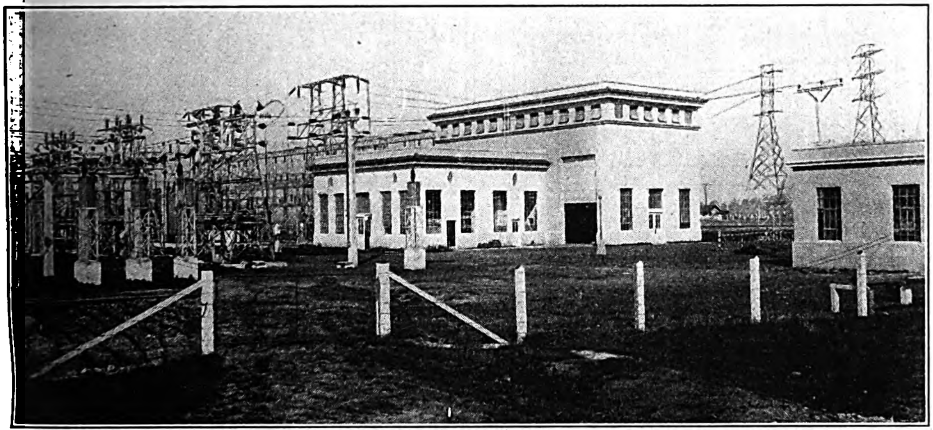


Fig. 22—Newark Substation—Pacific Gas & Electric Company

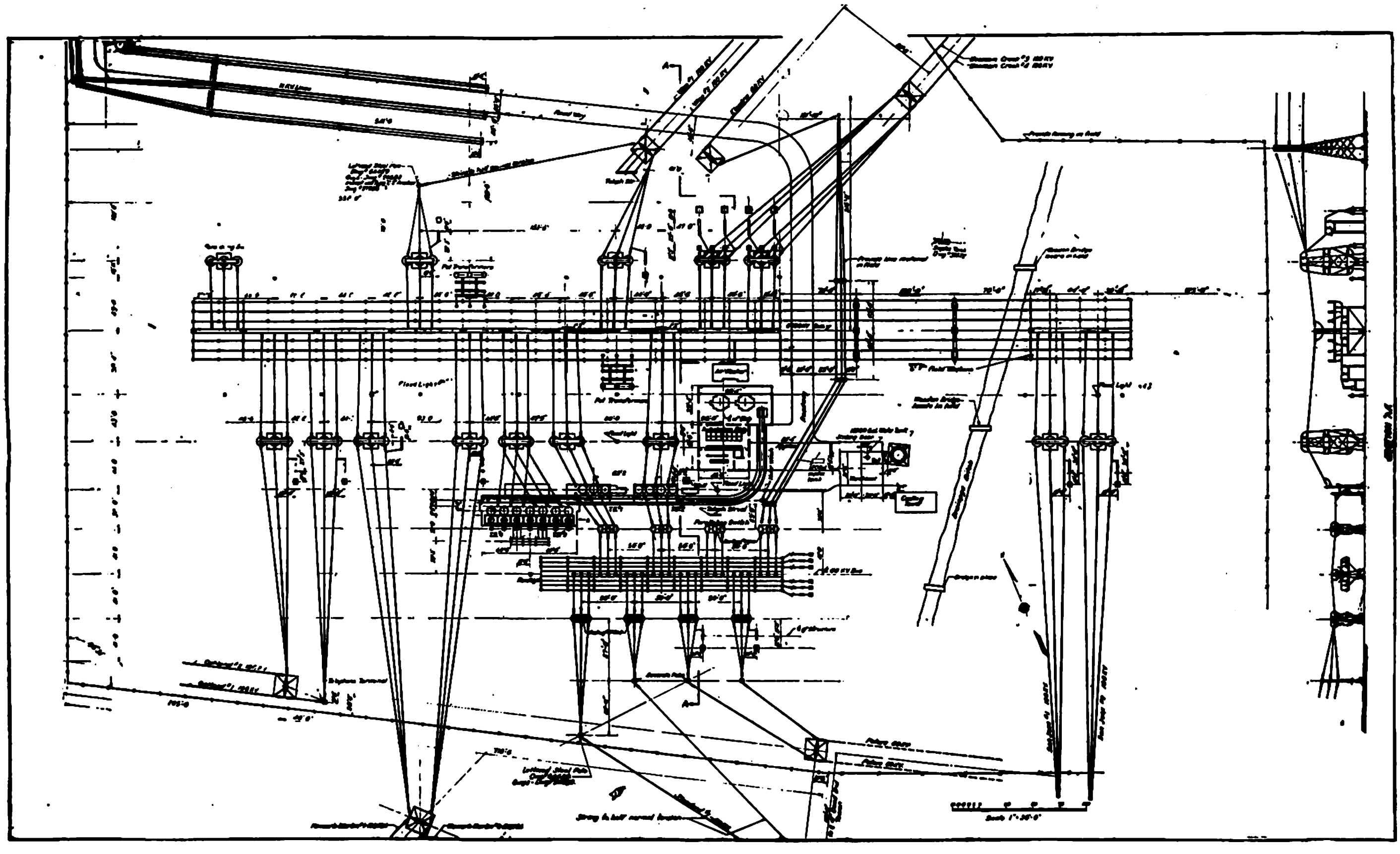


Fig. 23—General Outdoor Arrangement at Newark Stubstation—Pacific Gas & Electric Company

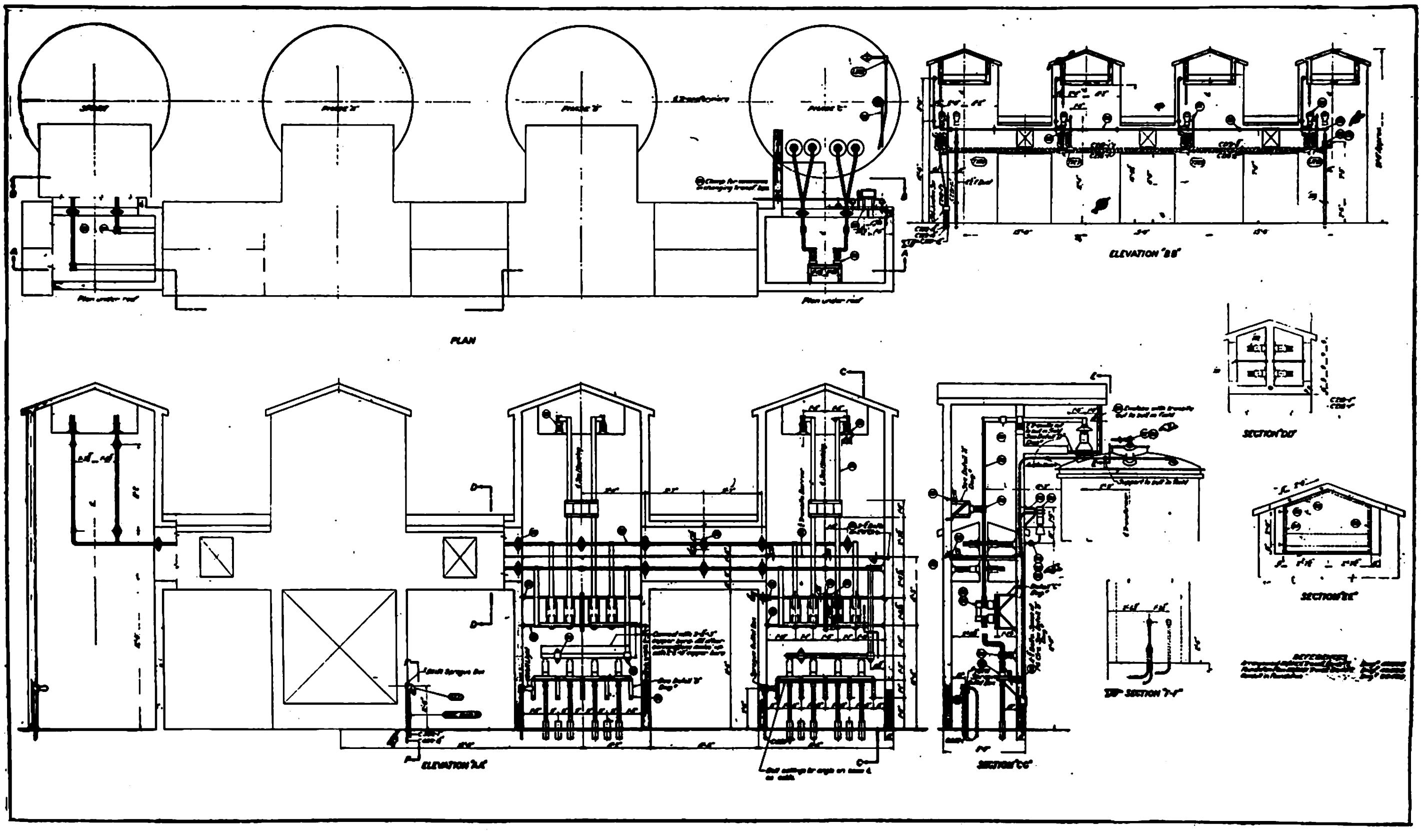


Fig. 24—Arrangement of 11*Kv. Transfer Switches and Bus for* 100/60/11 *Kv. Transformer Bank at Martin Substation—Pacific Gas & Electric Company*

switches are connected by shafting to a motor which operates automatically to suit voltage requirements.

The feeder circuit breakers at this station are of the automatic reclosing type. These are also being applied to all new stations and many older stations will be equipped with this type of apparatus as rapidly as possible.

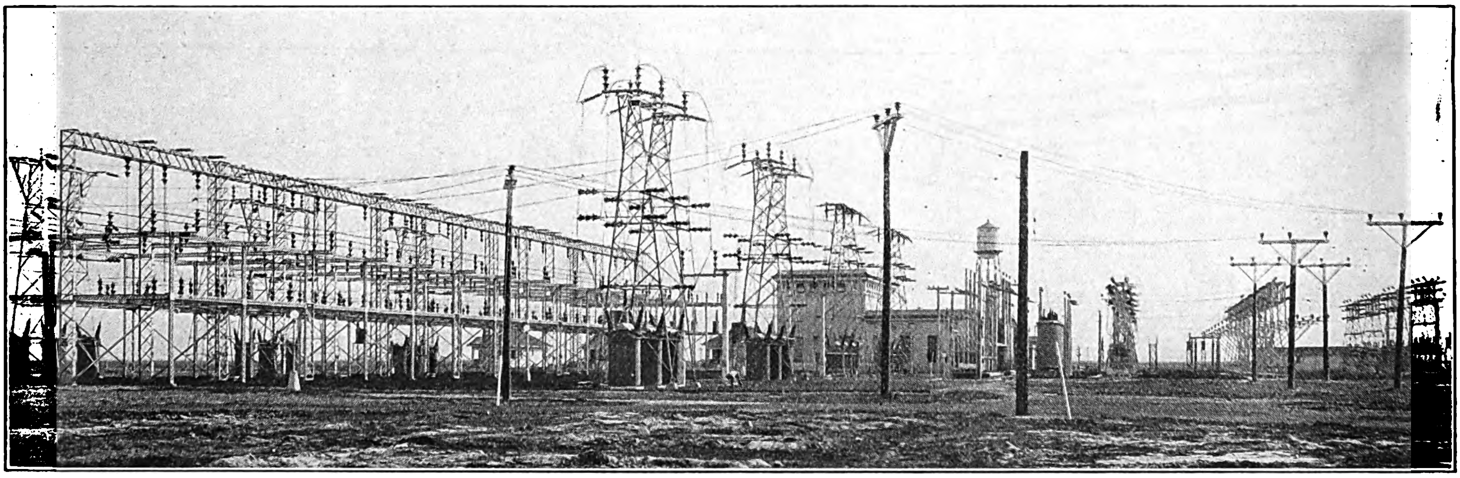


Fig. 25—Newark Substation—Pacific Gas & Electric Company

N. E. L. A. committee reports constitute a unique body of experience data, compiled and revised as progress requires by a body of volunteer workers who are authorities in their respective fields. Taken as a whole these reports constitute the operating history of the electrical industry in the United States.

The value of engineering committee reports is attested by a steady stream of orders from all parts of the world. Engineers abroad recognize the leadership of the American electrical industry and look to the reports of N. E. L. A. engineering committees for guidance.

The attention of all concerned is invited to the list of N. E. L. A. publications which appears on pages 4 and 5 of this issue.

Service Suggestions
NATIONAL ELECTRIC LIGHT ASSOCIATION — COMMERCIAL NATIONAL SECTION
CUSTOMER RELATIONS COMMITTEE
H. T. EAST, *Chairman,* Public Service Co. of Northern Illinois, Chicago, Ill.
To formulate efficient methods of conducting relations between the customer, the public and the supply company, including such matters as taking applications in the office, forms, order routing, inquiries, complaints, meter reading, collections and credits

No. 67 **January, 1929**

Informing Our Customers About Our Business

By George J. Leibman

Assistant to General Sales Agent, Brooklyn Edison Company

THERE are many phases of the electric, light, and power business that our customers know little or nothing about. It is an acknowledged fact that the American public wants to know everything there is to be known, and our customers are only too glad to have the various phases of our business explained. In the words of Edward Bok, "The American Public Always Wants More, or Something a Little Better, Than It Asks for."

This knowledge of our business can be given to our customers in many ways. The simplest and most attractive way is naturally the best.

The information which customers should have is of several classes:

1. Information regarding the service and policies of the individual company.
2. Information regarding the ideals of the individual company and its attitude toward civic betterment of community growth.
3. Information regarding the proper use of appliances or equipment.
4. Information regarding the electrical industry in general.

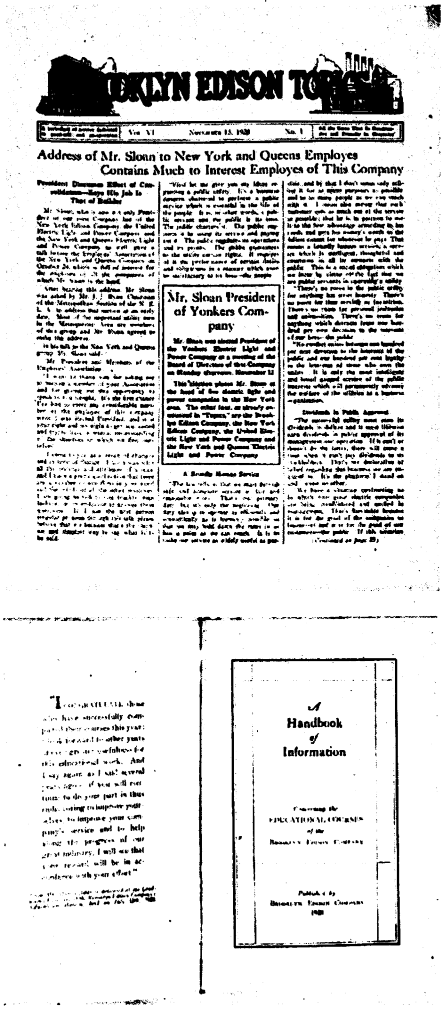
Let us consider some of the methods which have been successfully employed by operating companies in conveying such information to their customers.

Service and Policies of the Individual Company

The Indirect Method:

Perhaps the most important and productive method of informing customers indirectly of our service and policies is through the education of our employees so they will be willing and able to impart their knowledge intelligently and accurately to the customers with whom they come in contact.

Many of the companies have very complete courses covering the various phases of their business and organization. For example, in the Brooklyn Edison Company last year, there were 2153 course completions in 45 subjects. The average yearly course completions for the last five years were 1700. Some employees take more than one course each year. Over a period of years some employees take courses which practically cover every phase of company work. It can be readily seen that such an educational program produces a growing group of intelligent and well informed employees.



BROOKLYN EDISON TOPICS

Address of Mr. Sloan to New York and Queens Employes Contains Much to Interest Employes of This Company

Mr. Sloan President of Yonkers Company

A Handbook of Information

Methods of informing customers through intelligent employees. The Monthly Magazine tells what the Company and its employees are doing. The booklet describes the educational courses of the Company offered to all employees.

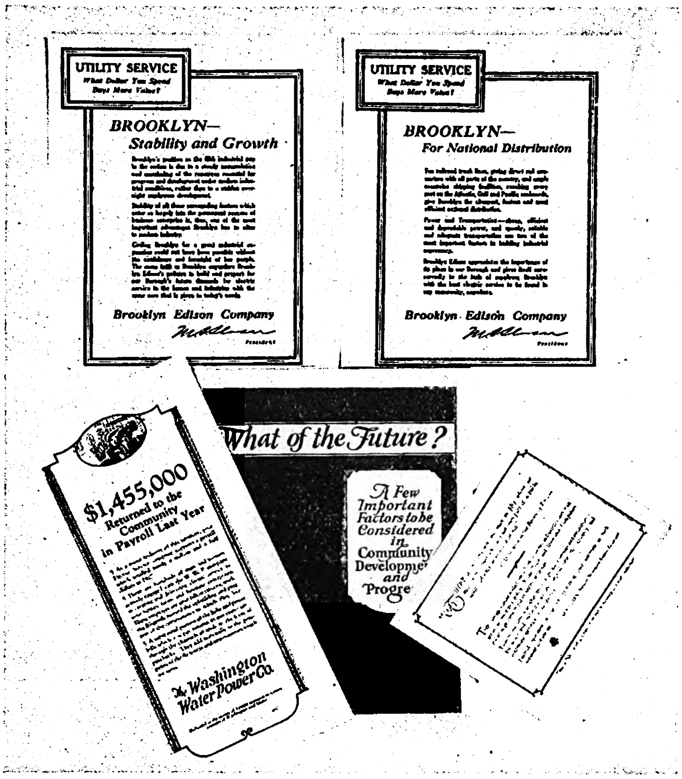
Other methods of educating employees which have produced worth while results are departmental meetings addressed by department heads and executives and meetings of smaller groups headed by members of the supervisory force. Group conferences are also widely used. Under the group conference plan employees doing a certain line of work are brought together and a conference leader who has prepared material to stimulate discussion on various features of the particular job leads discussions within the group. All of these plans have merit if properly organized.

House organs and periodic pamphlets issued to employees describing employee happenings and company activities are also helpful for their supplemental educational value.

An open house for newspaper reporters, permitting them to observe company employees and company activities, is a fertile source of news stories which usually reflect friendliness to the public.

The Direct Method:

There are many direct methods of informing our customers regarding fea-


UTILITY SERVICE
What Dollar You Spend Buys More Value?
BROOKLYN—Stability and Growth
Brooklyn Edison Company
UTILITY SERVICE
What Dollar You Spend Buys More Value?
BROOKLYN—For National Distribution
Brooklyn Edison Company
What of the Future?
A Few Important Factors to be Considered in Community Development and Progress
$1,455,000 Returned to the Community in Payroll Last Year
The Washington Water Power Co.

Information in newspapers, pamphlets and bill enclosures which show the relation of the company to community life and growth

THE FACTS and THE PUBLIC
TAKING ELECTRICITY TO THE FARM
THE UTILITIES and the SAVINGS BANKS
THE KILOWATT AND PROSPERITY
M. S. SLOAN
Comfort —By Wire
The Washington Water Power Co.
OUR STEWARDSHIP
OURSELVES AND THE PUBLIC
M. S. SLOAN
THE ELECTRICAL SYSTEM OF THE FUTURE

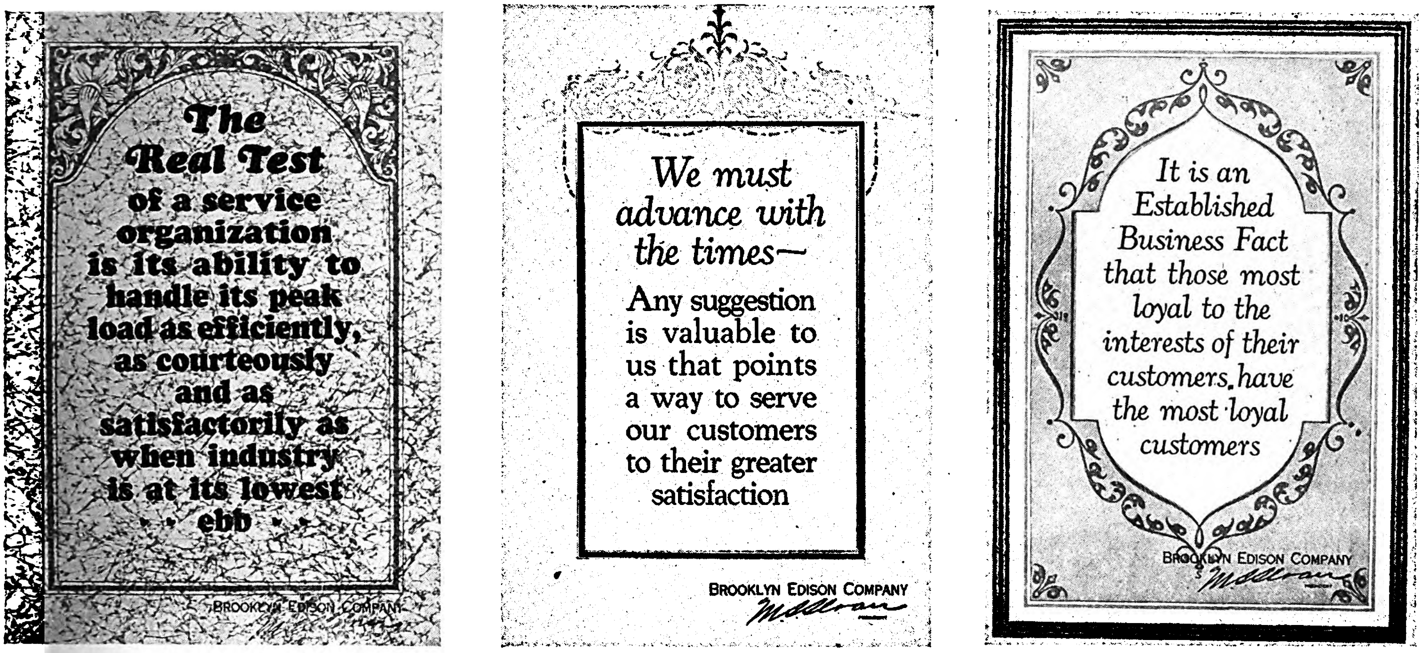
Informing the customer about the electrical industry in general by copies of speeches in pamphlet form and by newspaper advertising

Service Every Day Holidays Included
What Service means to Service Men
Payable on Demand
BEC
Reliability
YOUR PART IN OUR REPUTATION
SERVING THE MASS AND THE INDIVIDUAL
And another friend was made
For Friendly Service
BROOKLYN EDISON COMPANY
IN LESS THAN TEN MINUTES
When Minutes Count

Bill enclosures which tell about service

CHELAN POWER
The Washington Water Power Co.
WASHINGTON WATER POWER COMPANY SPOKANE
Power Stations
The Washington Water Power Co.
HUDSON AVENUE GENERATING STATION
BROOKLYN EDISON COMPANY
Better Public Service
Our improved facilities and how you can use them Conveniently
UNION ELECTRIC LIGHT AND POWER COMPANY
The MODEL FARM
SERVICE COMPANY OF NORTHERN ILLINOIS
NEAR MUNDELEIN ILLINOIS
SERVING NORTHERN ILLINOIS

Pamphlets which tell the customer about service



The
Real Test
of a service
organization
is its ability to
handle its peak
load as efficiently,
as courteously
and as
satisfactorily as
when industry
is at its lowest
ebb

BROOKLYN EDISON COMPANY

We must
advance with
the times—

Any suggestion
is valuable to
us that points
a way to serve
our customers
to their greater
satisfaction

BROOKLYN EDISON COMPANY

It is an
Established
Business Fact
that those most
loyal to the
interests of their
customers, have
the most loyal
customers

BROOKLYN EDISON COMPANY

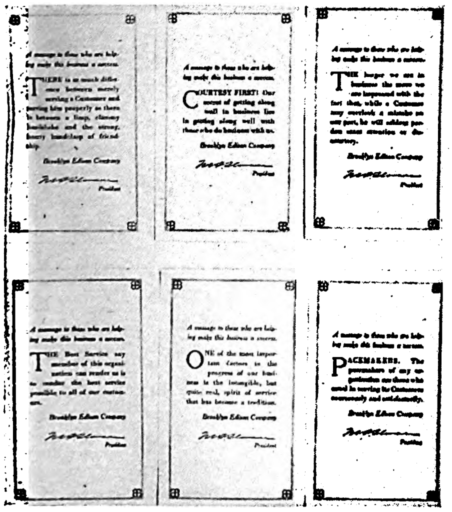
Placards for display in offices visited by customers. They show friendliness to the customers and a desire to serve.

tures of service and company policies. Some companies have found illustrated lectures and motion pictures most valuable.

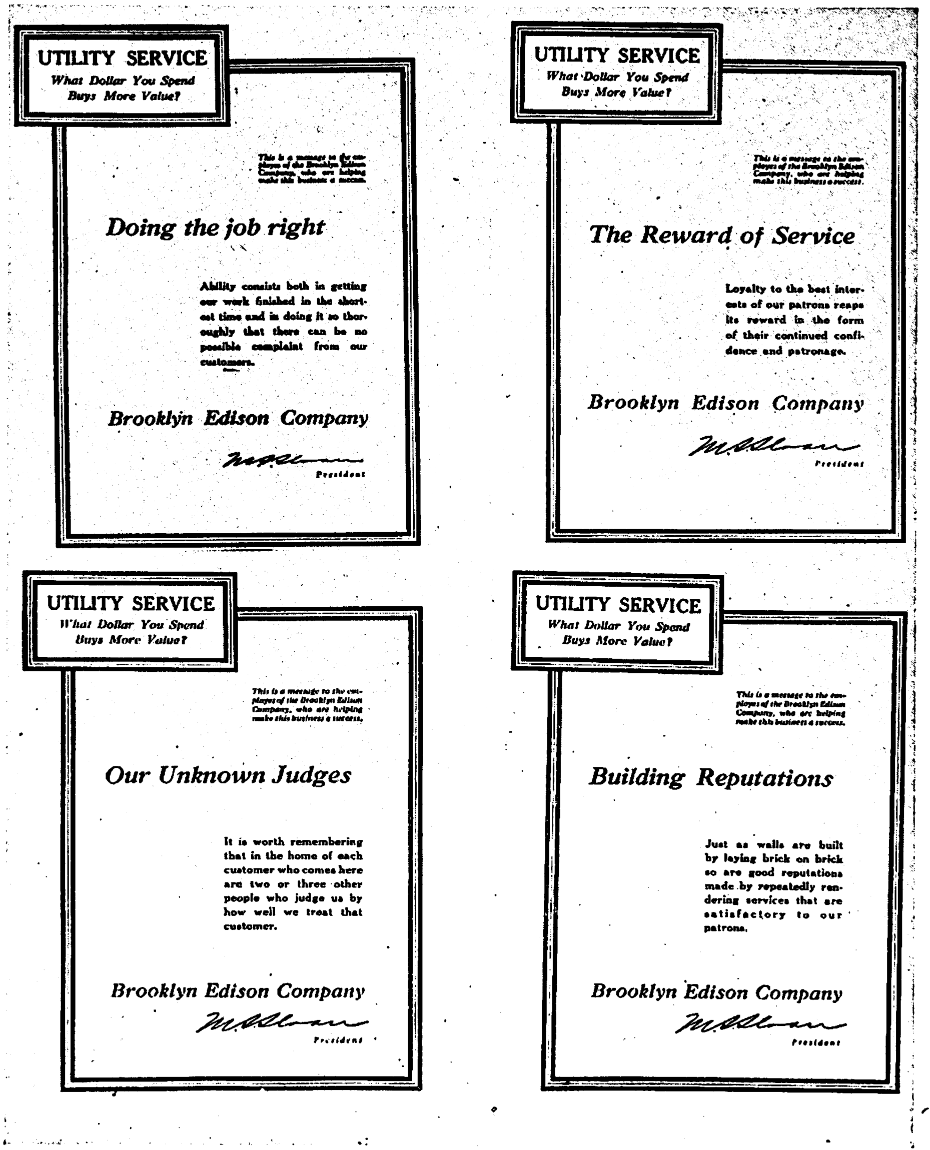
Personally conducted visits of customers to company plants is a plan followed by many companies. In the case of the Brooklyn Edison Company, 10,000 people have been conducted through its Hudson Avenue Generating Station in the last two years. During an "Open House Week" held by a midwestern company over 27,000 visitors were shown through its various plants.

Bill inclosures are a direct and very effective means of carrying information to customers.

The newspaper, either by means of advertising or news items is obviously



Weekly messages to employees in leaflet form.



UTILITY SERVICE
What Dollar You Spend Buys More Value?

This is a message to the employees of the Brooklyn Edison Company, who are helping make this business a success.

Doing the job right

Ability consists both in getting our work finished in the shortest time and in doing it so thoroughly that there can be no possible complaint from our customers.

Brooklyn Edison Company

President

UTILITY SERVICE
What Dollar You Spend Buys More Value?

This is a message to the employees of the Brooklyn Edison Company, who are helping make this business a success.

The Reward of Service

Loyalty to the best interests of our patrons reaps its reward in the form of their continued confidence and patronage.

Brooklyn Edison Company

President

UTILITY SERVICE
What Dollar You Spend Buys More Value?

This is a message to the employees of the Brooklyn Edison Company, who are helping make this business a success.

Our Unknown Judges

It is worth remembering that in the home of each customer who comes here are two or three other people who judge us by how well we treat that customer.

Brooklyn Edison Company

President

UTILITY SERVICE
What Dollar You Spend Buys More Value?

This is a message to the employees of the Brooklyn Edison Company, who are helping make this business a success.

Building Reputations

Just as walls are built by laying brick on brick so are good reputations made by repeatedly rendering services that are satisfactory to our patrons.

Brooklyn Edison Company

President

Examples of newspaper advertising which inform customers, as well as our employees.

an important medium for disseminating company information.

Ideals of the Individual Company and Its Relation to Civic Betterment or Community Growth

Many companies encourage their local representatives to join the local civic organizations and clubs and to take an active part in their work. This gives an excellent opportunity for these representatives to keep such organizations informed.

Participation of company representatives in the campaigns of approved charitable organizations, membership drives of the chamber of commerce, and other similar activities is a link in civic betterment which many companies weld. The use of company bill boards or company show windows to further the work of these organizations is frequently offered.

Joining in and supporting such activities as safety and resuscitation, accident prevention, boy scout movements, and in general backing all worthy civic projects offers further means of informing the public as to our ideals and the place we hold in the community.

Utility companies have an obligation to the community in which they operate and should give loyal support to all of their worthy projects.

The display of placards in the offices where our customers visit, telling of our ideals and friendliness, is also effective.

Bill inclosures may also be used to good advantage for this purpose.

Proper Use of Appliances and Equipment

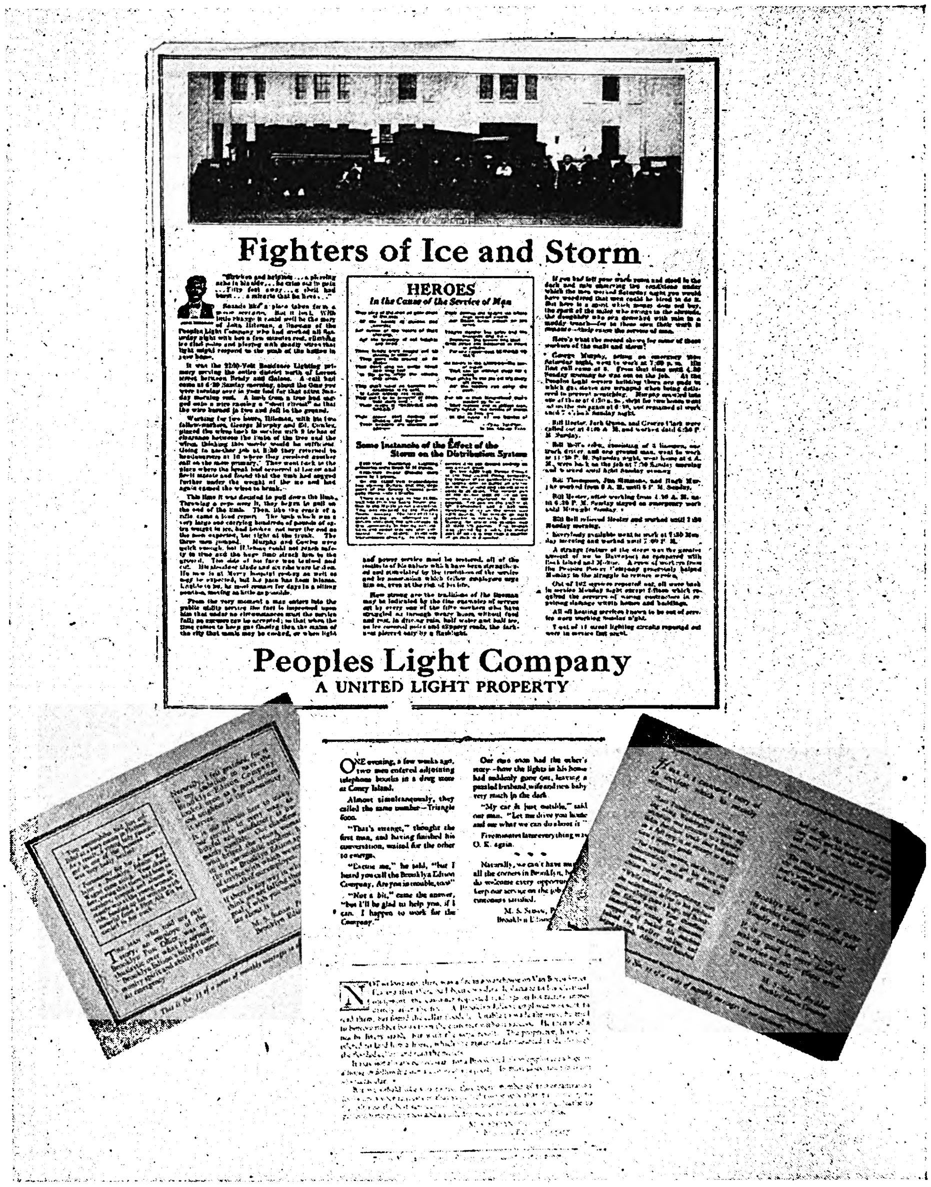
Perhaps the home economics work being carried on by the majority of companies is the most desirable medium for informing our customers regarding the proper use of appliances.

Lighting exhibitions, model homes, electric sign shows, electric shows, with their many variations can be used to inform customers how to obtain better use of the service supplied.

The Brooklyn Edison Company has taken advantage of the proximity of the Lighting Institute of the Edison Lamp Works at Harrison, N. J., to transport in buses hundreds of its merchants and others to observe the display and hear the lectures on proper lighting.

Lighting talks by the illuminating engineers of the various companies, model show windows, etc., are primarily, of course, sales activities, but nevertheless are educational.

The novel idea of the Rochester Gas



Fighters of Ice and Storm

HEROES

In the Cause of the Service of Man

Some Instances of the Effect of the Storm on the Distribution System

Peoples Light Company

A UNITED LIGHT PROPERTY

ONE evening, a few weeks ago, two men entered adjoining telephone booths in a drug store at Coney Island.

Almost simultaneously, they called the same number—Triangle 6000.

"That's strange," thought the first man, and having finished his conversation, waited for the other to emerge.

"Excuse me," he said, "but I heard you call the Brooklyn Edison Company. Are you in trouble, too?"

"Not a bit," came the answer, "but I'll be glad to help you, if I can. I happen to work for the Company."

Our man soon had the other's story—how the lights in his home had suddenly gone out, leaving a puzzled husband, wife and new baby very much in the dark.

"My car is just outside," said our man. "Let me drive you home and see what we can do about it."

Five minutes later everything was O. K. again.

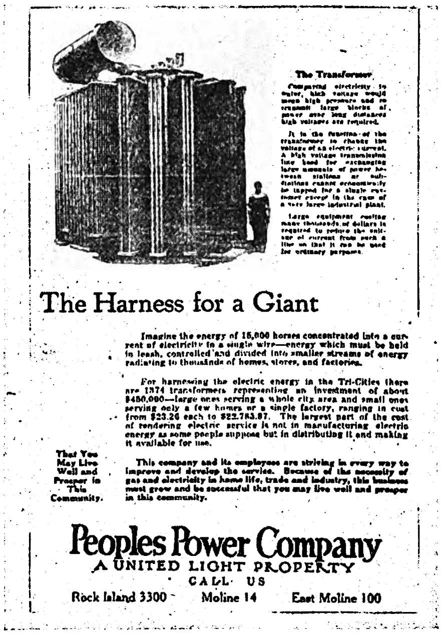
* * *

Naturally, we can't have me all the corners in Brooklyn, b do welcome every opportu keep our service on the job customers satisfied.

M. S. Sloan, P

Brooklyn E

Newspaper advertising and bill enclosures which feature the employees and their desire to render real service to customers



The Transformer

Comparing electricity to water, high voltage would mean high pressure and to transmit large blocks of power over long distances high voltages are required.

It is the function of the transformer to change the voltage of an electric current. A high voltage transmission line used for exchanging large amounts of power between stations or substations cannot economically be tapped for a single customer except in the case of a very large industrial plant.

Large equipment costing many thousands of dollars is required to reduce the voltage of current from such a line so that it can be used for ordinary purposes.

The Harness for a Giant

Imagine the energy of 16,000 horses concentrated into a current of electricity in a single wire—energy which must be held in leash, controlled and divided into smaller streams of energy radiating to thousands of homes, stores, and factories.

For harnessing the electric energy in the Tri-Cities there are 1374 transformers representing an investment of about $480,000—large ones serving a whole city area and small ones serving only a few homes or a single factory, ranging in cost from $23.26 each to $22,783.87. The largest part of the cost of rendering electric service is not in manufacturing electric energy as some people suppose but in distributing it and making it available for use.

That You May Live Well and Prosper in This Community.

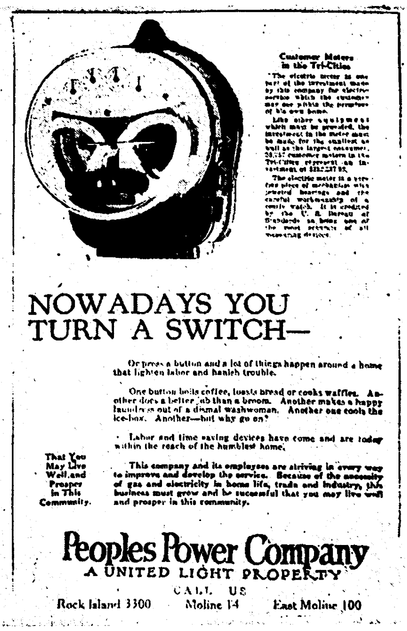
This company and its employees are striving in every way to improve and develop the service. Because of the necessity of gas and electricity in home life, trade and industry, this business must grow and be successful that you may live well and prosper in this community.

Peoples Power Company

A UNITED LIGHT PROPERTY

CALL US

Rock Island 3300 Moline 14 East Moline 100



Customer Meters in the Tri-Cities

The electric meter is one part of the investment made by this company for electric service which the customer may see within the premises of his own home.

Like other equipment which must be provided, the investment in the meter must be made for the smallest as well as the largest consumer. [illegible] customer meters in the Tri-Cities represent an investment of [illegible]

The electric meter is a very fine piece of mechanism with jeweled bearings and the careful workmanship of a costly watch. It is credited by the U. S. Bureau of Standards as being one of the most accurate of all measuring devices.

NOWADAYS YOU TURN A SWITCH—

Or press a button and a lot of things happen around a home that lighten labor and banish trouble.

One button boils coffee, toasts bread or cooks waffles. Another does a better job than a broom. Another makes a happy laundress out of a dismal washwoman. Another one cools the ice-box. Another—but why go on?

Labor and time saving devices have come and are today within the reach of the humblest home.

That You May Live Well and Prosper in This Community.

This company and its employees are striving in every way to improve and develop the service. Because of the necessity of gas and electricity in home life, trade and industry, this business must grow and be successful that you may live well and prosper in this community.

Peoples Power Company

A UNITED LIGHT PROPERTY

CALL US

Rock Island 3300 Moline 14 East Moline 100

Informing the customer through the newspaper about service.

and Electric Company in financing and installing an eight mile highway lighting demonstration in a rural community with the avowed intention of demonstrating the assets of adequate lighting on public highways, created a renewed spirit of friendship for the company and added many customers to its lines.

Several companies instruct customers in the proper use of fuses, in some cases mailing customers several fuses with a leaflet showing how to install them. No charge is made for these fuses.

The investigation of radio interference for customers is also valuable from an educational as well as good-will standpoint.

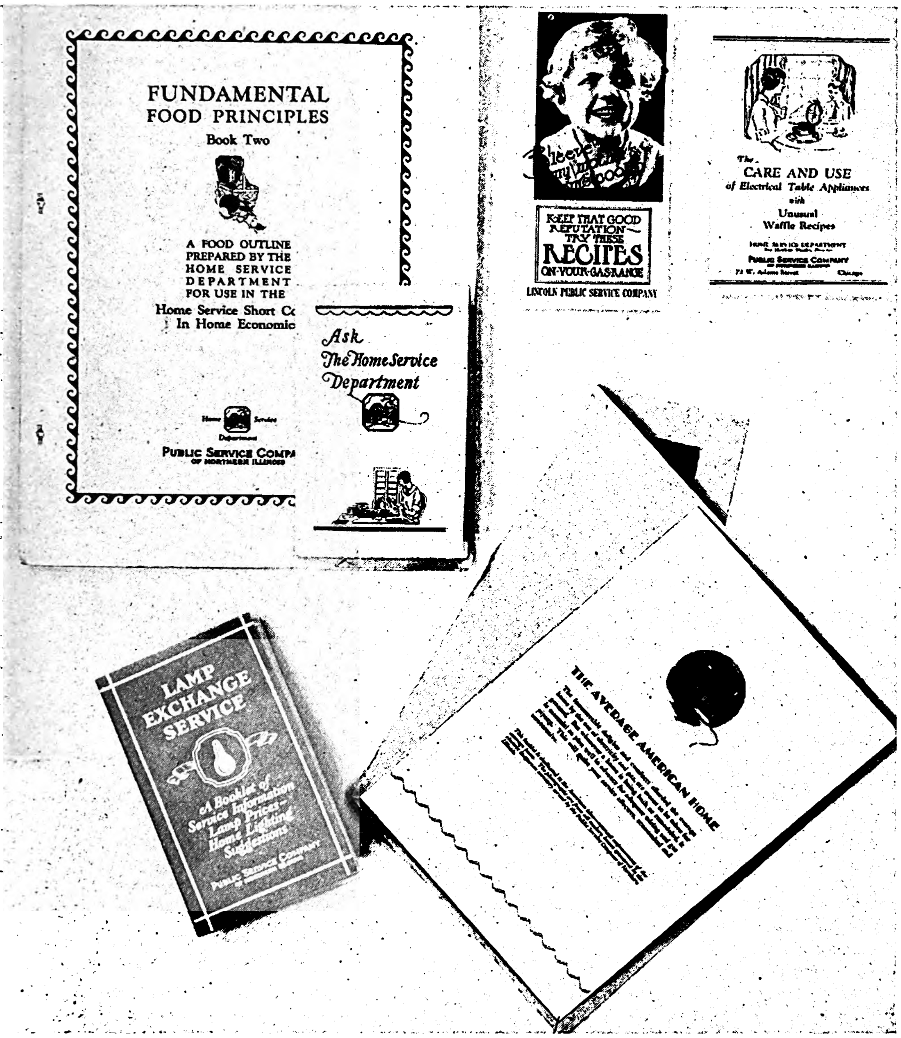
Electrical Industry in General

Individual companies and state utility information organizations are taking advantage of the demand from civic associations and clubs for speakers on educational subjects. Experience has proved that speakers on subjects pertaining to the electrical industry are always welcome at such meetings.

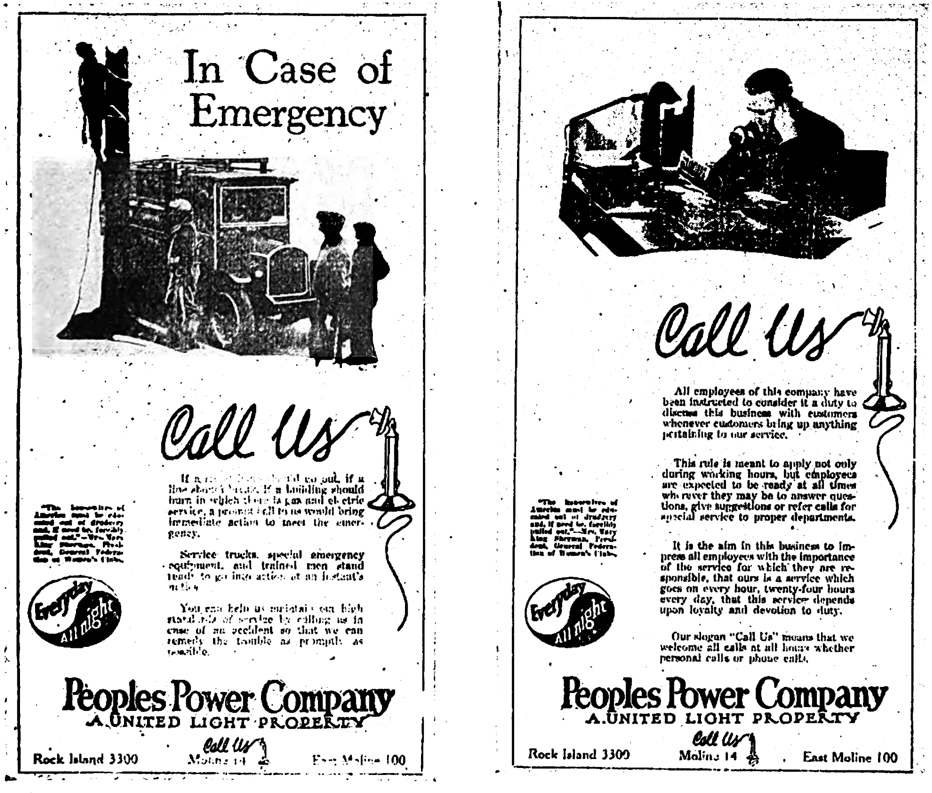
It is true also in the schools, particularly in the junior high schools, which frequently request speakers from the local companies to give elementary information regarding the business of the electrical industry. Many repeat requests are received, particularly where the talks are illustrated by motion pictures or lantern slides. These talks are highly educational and are often woven in with utility subjects treated by courses offered in the schools.

Copies of speeches by executives regarding our business are sent to all customers by some of the companies, either as bill inclosures or under separate cover.

Exhibits depicting the growth or development of the industry always command a large and interested attendance of customers. At these exhibitions an opportunity is afforded to display to the visiting public, literature which is supplementary to the educational value of the exhibit itself. The Rochester Gas and Electric Company reports that last year over 150,000 people visited the company's exhibit at the Rochester Industrial Exposition and viewed its interesting historical exhibit portraying and comparing the old-fashioned and the modern home with the contrasting evidence of oil lights with electric lights, wash tubs with electric washers, gas or electric range with the old coal range, and other ex-


FUNDAMENTAL FOOD PRINCIPLES
Book Two
A FOOD OUTLINE PREPARED BY THE HOME SERVICE DEPARTMENT FOR USE IN THE Home Service Short Co
In Home Economic
PUBLIC SERVICE COMPA
Ask The Home Service Department
KEEP THAT GOOD REPUTATION TRY THESE RECIPES ON YOUR GAS RANGE
LINCOLN PUBLIC SERVICE COMPANY
The CARE AND USE of Electrical Table Appliances with Unusual Waffle Recipes
LAMP EXCHANGE SERVICE
A Booklet of Service Information Lamp Prices Home Lighting Suggestions
THE AVERAGE AMERICAN HOME

Methods of informing customers on proper use of appliances.


In Case of Emergency
Call Us
Everyday All night
Call Us
Everyday All night

If a [illegible] should go out, if a line should break, if a building should burn in which there is gas and electric service, a prompt call to us would bring immediate action to meet the emergency.

Service trucks, special emergency equipment, and trained men stand ready to go into action at an instant's notice.

You can help us maintain our high standards of service by calling us in case of an accident so that we can remedy the trouble as promptly as possible.

"The housewives of America must be educated out of drudgery and, if need be, forcibly pulled out."—Mrs. Mary King Sherman, President, General Federation of Women's Clubs.

Peoples Power Company
A UNITED LIGHT PROPERTY
Call Us
Rock Island 3300 Moline 14 East Moline 100

All employees of this company have been instructed to consider it a duty to discuss this business with customers whenever customers bring up anything pertaining to our service.

This rule is meant to apply not only during working hours, but employees are expected to be ready at all times wherever they may be to answer questions, give suggestions or refer calls for special service to proper departments.

It is the aim in this business to impress all employees with the importance of the service for which they are responsible, that ours is a service which goes on every hour, twenty-four hours every day, that this service depends upon loyalty and devotion to duty.

Our slogan "Call Us" means that we welcome all calls at all hours whether personal calls or phone calls.

"The housewives of America must be educated out of drudgery and, if need be, forcibly pulled out."—Mrs. Mary King Sherman, President, General Federation of Women's Clubs.

Peoples Power Company
A UNITED LIGHT PROPERTY
Call Us
Rock Island 3300 Moline 14 East Moline 100

Informing the customer through the newspaper about service.

hibits which contrast the modern conveniences with the old makeshifts.

Interesting Educational Material

It is unfortunate that the amount of space that can be allotted to a Service Suggestion precludes presenting all of the valuable and interesting educational material which is being used by the various companies in giving information to their customers.

The photograph of a pamphlet may give some idea of the outside appearance of it but does not permit the reader to see the contents nor the great effort and fine ideals which the individual company has woven into its production. Neither can photographs accurately illustrate the attractiveness which goes a long way toward creating an appeal to read such literature.

The educational material illustrated has been grouped, as nearly as possible, into the four classifications above described. Space permits the illustrating of only a few of the many excellent examples collected. If samples of literature shown or any other information regarding methods mentioned in this Service Suggestion are desired, the Customer Relations Committee will endeavor to obtain them from the individual companies.

Many methods of informing customers about our business are available to modern utility companies and efforts to create a better understanding between company and public through their use cannot fail to aid in the improvement of our public relations.

The Customer Relations Committee is equipped to make studies of ideas, practices, and policies which have a bearing upon the relationship which exists between light and power companies and their customers and will be glad to collect data and furnish suggestions upon any phase of company operation which falls within the scope of its functions. Requests for information or assistance may be addressed directly to the Chairman.—H. T. EAST, *Chairman*, c/o Public Service Co. of Northern Illinois, Chicago, Ill.

Federal Electric Company

AWARD

of

$1,000 and Gold Medal

for

the Greatest Contribution

to

ELECTRICAL ADVERTISING

* * *

The Award is to be made annually to the member company of the National Electric Light Association that contributes most to the advancement of the electrical advertising industry each year. This contribution may be in the form of:

(a) A new use for electrical advertising;
or (b) An identification program, such as has been inaugurated by certain holding companies;
or (c) An enterprise whereby businesses throughout the country, or in a particular community, are brought to a keener realization of the value of electrical advertising;
or (d) An activity which makes possible better merchandising or electrical advertising displays.

The Award

The Award is a Gold Medal to the company making the greatest contribution to electrical advertising during the period of the contest year, and $1,000.00 to the individual in that company responsible for the achievement.

The Period of the Contest

The first contest year will be retroactive and will include the twelve months period ending February 28, 1929.

Exhibits must be filed at N. E. L. A. Headquarters on or before April 15, 1929.

Announcement of the winner will be made at the annual N. E. L. A. Convention.

Registration blanks may be secured from C. E. Greenwood, Commercial Director, N. E. L. A., 420 Lexington Ave., New York, N. Y.

ENGINEERING SECTION

E. C. Stone, *Chairman* H. S. Bennion, *Director of Engineering, N. E. L. A.*

Prime Movers Committee Meeting

By Edwin B. Ricketts, *Chairman*

An exceptionally well attended meeting of the Prime Movers Committee was held in Buffalo, N. Y., on Nov. 12 and 13. There were 41 Counsellors, Officers and Members-at-Large, 4 representatives of Geographic Divisions and 6 guests.

Boiler and Turbine Room Instrument Subcommittee

The final report of the Boiler and Turbine Room Instrument Subcommittee was submitted by Mr. Frost, who outlined the contents of the report and called attention to the increased satisfactoriness of instruments as compared with ten years ago, although likewise emphasizing the necessity for continued improvement not only in the instruments themselves but in the care and accuracy of their installation and use.

Burning Liquid and Gaseous Fuels Subcommittee

The report of the subcommittee on Burning Liquid and Gaseous Fuels contained considerable information on methods of measuring gas for boiler purposes and also many data from various plants showing the heat liberation in various water cooled furnaces when used with oil or gas as fuel. Apparently in a great many installations water cooled furnace walls accumulate a thin coating of ash and are thus somewhat insulated from the intense heat in the furnace. This does not occur with gas or oil fires and some experience indicates that it may be necessary to design water cooled walls for lesser rates of heat transfer than has been the case in the past.

Coal and Ash Handling Subcommittee

Mr. Hurst in presenting the report of the Coal and Ash Handling Subcommittee, called attention to most prominent questions at the present time in connection with pulverized fuel. One is the arrangement for tapping ash from bottom of furnaces in the molten form and the other is experiments being performed to determine the best method of collecting the fly ash from pulverized coal furnaces. The committee will continue this investigation for next year, although considerable data was included in this year's report on these two subjects.

Distillation Products of Coal Subcommittee

An extensive report on the subject of Distillation Products of Coal was submitted by Mr. Lawrence, chairman of this subcommittee. The conclusion seemed to be that most of the past year's activities were by way of improving upon plants and methods already in experimental operation and in further analyzing the economics involved. It seems that particular attention should be paid to the market value of the principal by-products since it usually is necessary to obtain an appreciable return from these by-products before the process as a whole can be justified from a dollars and cents standpoint.

Operating Code Manual Subcommittee

Mr. Thompson submitted final report of the Operating Code Manual Subcommittee, in which the various codes previously published were edited and brought together in standardized form.

When published this complete report will make a very comprehensive and satisfactory handbook for operating companies to use either by way of educating their operators or as basis for the production of operating codes of their own as applied to their particular stations. The matter in this report has been very carefully worked out from the results of several operating companies and represents the best modern practice.

Feed Water

Treatment of Feed Water was covered in a report presented by Mr. Irwin, in which it was shown that about half of the 35 central station plants reporting use evaporators, 7 use chemical treatment, 7 use raw water and 2 use Zeolite softeners. Several companies find it necessary to add sodium phosphate to the distillate from evaporators in order to counteract the small amount of solids carried over with the vapor from the evaporators. There was considerable discussion of caustic embrittlement and another committee member reported trouble recently from this cause where a very pure feed water had been used which, however, showed an excess of carbonate over sulphate content beyond the usually accepted standard ratio of 1 to 3. Considerable discussion on this subject developed the fact that so far no trouble has been known to develop in which the sulphate-carbonate ratio was kept at 3 or more.

Boilers, Superheaters and Economizers

Preliminary reports were submitted by Mr. Alden on Boilers, Superheaters and Economizers. Considerable discussion developed on the question of water cooled furnaces, the rate of heat transfer and width of fins on the fin type walls. Likewise, the question of arrangement and degree of circulation for water walls was discussed at length. Apparently different companies are having satisfactory results with widely different circulation arrangements, some using recirculating tubes and others no recirculating tubes, but with liberal pipe connections to and from the water walls.

Condenser Subcommittee

Mr. Bell made preliminary report for the Condenser Subcommittee and asked for data on heat transfer, particularly for single pass condensers.

Foreign Developments Subcommittee

Professor Christie, chairman of the Foreign Developments Subcommittee, was absent on account of illness, but reported by letter, stating that reports were expected from foreign correspondents and that the final report would be ready for the February meeting.

Specifications Subcommittee

Mr. Iddles presented preliminary report of Specifications Subcommittee, in which standardized specifications for air preheaters, closed heaters and deaerating equipment are included. These specifications are drafted along the line of previous reports of this subcommittee and this year's report completes specifications for all major items of mechanical power plant equipment.

In addition, this subcommittee's report includes an extensive bibliography of specifications of other standardizing bodies covering all kinds of material and equipment used in power plants. The bibliography is arranged by numbers according to the source of the standards and alphabetically according to subjects. References are particularly made to publications of the American Society of Testing Materials, American Standards Association, Federal Specification Board, American Society of Mechanical Engineers, Bureau of Standards and Bureau of Mines.

This bibliography is intended to bring under one cover references to all manner and types of specifications which from time to time are referred to by power plant engineers when writing specifications for specific requirements.

The preliminary report of this committee was substantially complete and it was suggested that the report be finished by addition of the necessary introduction and submitted as a final report prior to the February meeting.

Induced Draft Fan Performance

Round table discussion on Tuesday covered the subject of induced draft fan performance in which recent apparent failures of fans to perform in accordance with manufacturers' guarantees had been claimed by the manufacturer to be due to supersaturated water vapor in the flue gases which condensed in the first Orsat tube and thus caused a better CO_2 reading than actually existed. The manufacturer claimed that this might reduce CO_2 from 10 to 8 and thereby materially increase the quantity of excess air and therefore the calculated quantity of flue gases being handled by the fan.

It was the opinion of the majority attending the meeting that the manufacturer was endeavoring to take advantage of a highly theoretical point to cover improper fan design.

There was some discussion on protection against fires in turbine rooms, particularly from broken or leaking oil pipes around turbines.

Recent developments in feed water regulators were discussed and several members reported satisfactory use of differential pressure regulators installed immediately ahead of the regular feed water regulator.

Pulverized Fuel Installation

Mr. E. G. Bailey, president of Fuller Lehigh Company, upon invitation of the committee, made an address outlining the development of the pulverized fuel installation in the Huntley Station of the Buffalo General Electric Company. This plant was visited in the afternoon by the entire committee and Mr. Bailey outlined the development of the well type furnace with tangential and with opposed firing. This plant is a standby and peak load plant and it therefore was desirable to obtain rapid steaming characteristics with maximum production per unit of space occupied. The result is a water cooled furnace of the well type with direct firing from large pulverizers operating on the unit system. The latest development is tapping of molten ash from the base of the furnace and discharge into a hydraulic sluice so arranged that the ash is broken up into small pieces and thence pumped through pipe line to adjacent fill.

The committee enjoyed a very satisfactorily arranged inspection trip to the Huntley Station and adjourned to meet on Feb. 4 and 5 in Pittsburgh.

Overhead Systems Committee Meeting

By **Harold Cole**, *Chairman*

THE Philadelphia meeting of the Overhead System Committee held Oct. 8-9 was attended by a large group of members, geographic division representatives and interested visitors which at times taxed the capacity of the large meeting room provided. There were 43 members-at-large, 7 geographic division representatives and about 50 vsitors registered during the two days of the meetings.

Committee Reorganization

Since the last meeting of the committee a plan of reorganization had been worked out by the newly formed Executive Committee which had held two meetings for the purpose. The Chairman outlined the new plan which provides for four major standing committees the scope of whose work practically covers the field of activities of the Overhead Systems Committee. Special subcommittees are being formed to study particular problems under each of these Committee Chairmen. The four standing committees and their chairmen are:

Transmission Lines Committee, Sydney Alling, Chairman.
Distribution Lines Committee, T. H. Haines, Chairman.
Materials and Equipment Committee, B. J. Barmack, Chairman.
Safety Rules Committee, E. J. Amberg, Chairman.

Each standing committee chairman described the organization of his committee and the subjects of special interest which were to be studied by its subcommittees.

The Chairmen of the standing committees, together with a number of the older and most active members of the main committee now form an Executive Committee, the purpose of which is to assist the Chairman in deciding upon matters of policy, to relieve the main committee of detailed consideration of reports and other routine matters, and in general to act as a steering committee to the main committee.

Zinc Meta-Arsenite Treatment of Wood Poles

A very interesting and instructive talk on the above subject was given by Mr. P. J. Howe, of the Western Union Telegraph Company and the Curtin-Howe Corporation. This new method of pole treatment has been developed by the Western Union Telegraph Company and is expected to replace to large extent the creosote treatment. It is less expensive, more permanent in its effect and leaves no surface deposits of excess preservative. Zinc Meta-Arsenite is a compound of arsenic and zinc which is very insoluble except in acids. It is dissolved in water by the use of acetic acid. The acid evaporates and leaves the insoluble zinc meta-arsenite in the wood. The preservative is also immune from leaching. It is applied by the pressure method to the full length pole, a cold solution being used. The Western Union has adopted zinc meta-arsenite treatment for all pine poles and pine cross arms.

Other advantages of this treatment are—poles can be painted after treatment, tnere are no ill effects to the face or hands of men handling the poles, the penetration of the treatment is greater than with creosote, it is apparently effective against termites or other insects, it does not increase the conductivity of the pole. The fact that the zinc meta-arsenite used for this treatment is a poison is not regarded as serious by Mr. Howe because it is not soluble in water and it would therefore be necessary to actually swallow some of the salt and have it acted upon by the acids of the stomach to make it effective.

Overhead Distribution Networks

Mr. M. T. Crawford of the Puget Sound Power and Light Company prepared a paper which was presented in his absence by Mr. T. A. Purton. The paper described a very novel and interesting development in distribution system design brought about largely by local conditions in Seattle. Due to competition with a city owned utility water-pipe grounds are prohibited. The alternative adopted was to tie all transformer secondaries in any one circuit together to form a network. The secondary neutral wires were also used as the neutral wires of the 2300/4000 volt primary system and the primary mains were connected in a network. The network is restricted to the area fed by one phase of a primary feeder. All of the transformers in this area are therefore connected across common primary and secondary mains. The common neutral is grounded at each transformer but a heavy neutral feeder is carried back to the substation from various points in the neutral grid over the same route as the three phase wires.

Advantages claimed for this system are:

Economy—The common primary and and secondary neutral makes it necessary to use only four wires instead of five in the network area; the network system makes maximum use of the diversity factor between various services; the system adapts itself readily to growth as it is only necessary to install a new transformer, to handle increased loads, no changes in primary or secondary copper being necessary.

Better voltage regulation—Secondary voltage drops are small as are also drops in the primary grid and by the use of single phase regulators and careful adjustment of compensators a maximum range of 5 volts variation is possible.

Better continuity of service—It has been found that by using No. 4 secondary mains throughout, a fault in the transformer or the secondary grid will not cause the entire grid to "cascade" but will only blow fuses on a few transformers producing a low voltage but not an entire interruption of service. The ability to burn off primary faults is a result of the networking of the primary mains. In 158 cases of primary short circuit during 1927, 152 burned clear.

No complaint of interference with telephone service which could not be remedied has resulted from the use of this system.

220 Kv. Construction and Operation

Mr. W. W. Woodruff of the Philadelphia Electric Company presented a timely paper which described the 220 Kv. transmission system now being constructed in the vicinity of Philadelphia to transmit power from the Conowingo Development on the Susquehanna River to Philadelphia and to interconnect the three large systems in the vicinity, namely, the Philadelphia Electric Company, the Pennsylvania Power and Light Company and the Public Service Electric and Gas Company of New Jersey. In this paper Mr. Woodruff brought out the development of design as experience was gained from the operation of the initial lines.

The first 220 Kv. line to be put into operation in the East was the Wallenpaupack-Siegfried Line of the Pennsylvania Power and Light Company which was placed in operation in 1926. This line was built without ground wires, using 14 units of insulators. The results were not entirely satisfactory as the line tripped out during lightning storms as a result of direct strokes on the line, although it was apparently immune from flashover due to induced strokes. Experimental installations of ground wires indicated that they were of considerable value in reducing the number of flashovers. Recent construction of 220 Kv. lines in this vicinity has included two ground wires over each circuit. All lines built in the East have been of single circuit construction with the wires in a horizontal plane. Ground wires are located midway between and above the line conductors.

During the 1928 lightning season the two Conowingo-Plymouth Meeting lines, which are on the same right-of-way 170 feet apart, experienced three trip-outs due to lightning, although the season was a severe one, 34 storms passing over the lines. Both lines were not affected at the same time. These lines comprise 115 circuit miles.

Mr. Woodruff draws the following conclusions from the experience of the last few years:

> Flashovers on 220 Kv. lines, insulated with 14 or more units, are due to direct strokes of lightning.
>
> By the use of ground wires and high line insulation, many direct strokes may be experienced without flashover.
>
> The use of grading shields may be helpful in reducing damage to insulator strings, but they are apparently not essential.

Transmission Line Insulation as a Source of Radio Interference

It has been found that serious interference to radio reception has been caused in some instances by high voltage transmission lines. The most serious cases have been experienced where 66 Kv. lines have been carried on pin type insulators. Apparently very little trouble has been caused by lines equipped with suspension insulators or by lines of less than 44 Kv. where insulators of a rating higher than the line voltage are used.

A discussion of this problem was led by Mr. M. D. Hooven, Chairman of the Radio Interference Subcommittee of the Inductive Coordination Committee. The experience of several operating companies was related. It was brought out that the trouble was caused by a discharge from the line and tie wires to the insulator. The cure for it is apparently to decrease the contact resistance at this point and insulators have been developed with a metallic coating in the line and tie wire grooves which give entirely satisfactory operation. The installation of these insulators at the point of interference, however, is ineffective as the line acts as a carrier to carry the disturbance caused by insulators in other sections of the line. Efforts to find a method of applying a cure to existing installations have not been very successful in most cases. Some relief has been obtained by placing a stove-pipe ring over the insulator and in contact with the line. It was reported that the Bureau of Standards had developed an aluminum paint which would retain its conducting properties indefinitely. If this is so, it should offer a fairly satisfactory solution.

The representatives of insulator manufacturers were invited to attend the session at which this problem was discussed and it is felt that the opportunity to interchange ideas was of great mutual benefit.

Reports

A Report was presented by Mr. T. H. Haines on "The Patrol and Inspection of Transmission Lines" which had previously been sent to the Committee membership. This report gives the practice of various member companies. It will be submitted as a serial report.

The Great Lakes Division Committee prepared a report on the "Operation of High Tension Transmission Lines during 1927" in their division which was submitted to the National Committee at the request of the Chairman. Mr. W. J. Ducey gave a synopsis of the report which will also be submitted as a serial report.

Rubber Gloves

Mr. K. R. MacKinnon, Chairman of a Special Committee on Rubber Gloves sought the advice of the Overhead Systems Committee as to the desirability of developing a rubber glove for use on voltages above 3000 volts. Gloves made under the present A.S.T.M. specifications are not intended for use above that voltage, although many companies are using them on 6600 volts and above. Mr. MacKinnon's committee proposes to ask the A.S.T.M. to develop a specification for a glove to be used on working voltages up to 8000 volts. The Overhead Systems Committee approved the Rubber Glove Committee's selection of 8000 volts as the proper upper limit for a new glove. They also agreed that the new glove should be somewhat longer than the present 3000 volt glove. It was brought out that gloves with curved fingers and which would more closely fit the hand would be possible in the near future. The Overhead Systems Committee members did not wish to commit themselves as to the desirability of making these features a requirement of the new specification. There was also considerable discussion of the desirability of rubber sleeves to protect the lineman's elbow.

Standardization

In a discussion of the various standardization projects which are under procedure of the American Engineering Standards Committee, it was brought out that members of the industry were being seriously inconvenienced by the slowness of action of the committees. This applies particularly to wood pole and weather-proof wire specifications. The Overhead Systems Committee at various times in the past has issued suggested specifications for wood poles which were widely used by member companies. Some of these are now out of print and also in need of revision. Specifications for pine poles were prepared several years ago but never issued because of the A.E.S.C. project. There was some expression of a feeling that the Overhead Systems Committee should not wait for the A.E.S.C. procedure but should make up suggested specifications for the use of member companies when they were requested.

The situation with respect to weather-proof wire is that the Overhead Systems Committee representative is holding out for certain provisions to which the other members of the A.E.S. Committee refuse to accede. The stand of Mr. W. G. Kelley, the N.E.L.A. representative on the A.E.S.C. sectional committee was approved by the Overhead Systems Committee and the Chairman was asked to take up with the Executive Committee of the Engineering National Section the question of the propriety of issuing a suggested specification prepared by the Overhead Systems Committee.

General

Other discussion included the whipping and vibration of conductors and the use of special insulators under fog conditions.

Most of the members of the Committee availed themselves of the opportunity to visit the Conowingo Plant and Plymouth Meeting Substation.

COMMERCIAL SECTION

Marshall E. Sampsell, *Chairman* C. E. Greenwood, *Commercial Director, N. E. L. A.*

Work of the Electric Water Heating Committee

By Norman T. Wilcox, *Chairman*

That domestic electric water heating has not been developed to anything like its economic possibilities seems quite evident.

That the Electric Water Heating Committee of the Commercial National Section of N. E. L. A. is now considering the economic and practical possibilities of developing this fruitful source of revenue is evidence of the necessity of defining the possibilities from the standpoint of an economic service. Variant conditions, such as climate, character of water supply, investment required by both service company and customer, nature and size of demand, time that the demand occurs, as well as character of heater used, all have a direct bearing. Systems of water heating that may be successful in one section of the country may not be best adopted to another region. The low wattage automatic storage heater, when time of use is automatically and definitely controlled, brings very little added investment or maintenance for the service company. On the other hand, these limitations result in more or less addition to the investment required on the part of the customer.

If larger heaters are used, say 3 to 5 kw. capacity, and there are no limitations as to time of use, the utility must at least pay for and maintain a larger transformer and distribution investment. In this case, no doubt, with a large number of installations, owing to diversity in the time of use, the after diversity demand at the *generating station* may be only a small fraction of the demand at the point of use. A 5 kw. heater may be justified at least for a time if lines or equipment cannot be used in any other gainful way. This is especially true in the early years of operation of a large water power plant.

Farm lines with a low customer density per mile of line and large capacity requirements for other uses may admit the use of comparatively large heater elements and demand without a proportional increase of investment at the *generating station*, but this condition might not exist at other points where customer density might make a low wattage off peak heater more economic.

The dollars both for investment and for service that definite percentages of customers can be persuaded to pay for a satisfying service is a fundamental condition, which must also be known before we can entirely decide as to the lowest kw-hr. rate to be charged for a supplemental service such as water heating.

Our committee is comprised of a membership from various sections of the country and is collaborating with the most experienced manufacturers of electric water heaters. Committee work will be supplemented by comparative field tests already made as well as to be made by companies in various parts of the country. These test data are to be checked by the engineering staff at N. E. L. A. headquarters. The committee hopes to place such definite information in the hands of member companies as to water heating practice both at home and abroad as will be of definite assistance to member companies in the determination of sales policies and rates, such as may be expected to prove of profit to customers and service company alike.

Such a report, we believe, is needed

and will be of great assistance to the manufacturers as well as to utility managements in their effort for greater service to the public as well as profit to themselves and other interests concerned.

We hope to complete the body of the report for the 1929 convention, although this may later be followed by a supplement covering such field tests and data as will not be immediately available. The collection of necessary data is already well under way and all interests are working together with the definite aim of producing a report such as will be of definite assistance to all concerned.

COMPANY SECTIONS

Metropolitan New York Section N. E. L. A. Meeting

APPROXIMATELY 3000 people attended the Dec. 14 meeting of the Metropolitan New York Section, N. E. L. A., held in the ballroom of the Waldorf-Astoria Hotel. The principal address was by M. S. Sloan and is printed elsewhere in this issue.

Mr. Sloan was presented by J. J. Ryan, assistant general superintendent, Bronx, of the New York Edison Company, who as chairman of the Metropolitan New York Section opened the meeting with a report on the scope of the Section and the activities of its numerous committees.

Mr. Ryan, reviewing the work and history of the Metropolitan Section, said in part:

"The Metropolitan New York Section has been in existence as a Section for 17 years. It has, during all this time, done a real effective job in carrying through with its purposes, which are to further the interests of the industry and the public which it serves. The Section has been particularly fortunate at all times in the kind and calibre of men it has had for Section chairmen, officers and committee workers, and they have all carried on faithfully and well, and merit the credit that should go with a job well done.

"Our organization scheme is extremely simple. Membership, for the most part, comes from the various utility companies operating within the Metropolitan Zone, namely, the Bronx Gas & Electric Company, the Brooklyn Edison Company, the New York Edison Company, the Queens Electric Light & Power Company, Staten Island Edison Corporation, the United Electric Light & Power Company, Westchester Lighting Company, the Yonkers Electric Light & Power Company. Our Section members are also Class 'B' members of the national body. At present most of the work is carried on in three general divisions, designated as the Accounting Division, the Commercial Division, and the Engineering Division. In each of these divisions there are a number of working committees made up to follow through on what are natural and logical subdivisions of the utility business. There are representatives on these various committees from every company. These representatives serve with the approval of their respective company department heads and executives. Meeting of these committees are held once a month, from October to May. At these meetings problems, practices and routines covering the particular phase of the work in which the committee is engaged are discussed. The discussion is very free and open, and results in acquiring of knowledge, making contacts and a training among the men in the various companies engaged in the same class of work which could be obtained in no other way. Minutes of the meeting are kept and reports made. There is a distinct relation and tie between these committees and committees of the national association, so that there is little or no wasted effort. It is a fact, however, that in our Metropolitan New York Section there are local problems in which the national organization is not concerned.

"A so-called One Day Convention is held once a year to which all members are invited and at which an outline of the work done by the committee during the year is presented. Men prominent in the utility field or allied industries are invited to address the membership at this One Day Convention.

"A summary or digest of committee reports is made for the information and use of the executives and department heads of the various companies.

"Three or four general meetings are also held during the year, similar to the present one. All members are asked to attend. These serve the useful purpose, by the delivering of addresses by prominent men, of keeping our members up to date in the trend, progress and development of our industry.

"There are also some general committees such as the Educational Committee, Committee on Employee Associations, and the Women's Activities Committee, which are doing a splendid, effective work.

"For the year's work we are very well under way. All of the committees have held two or three meetings, and all report good attendance and interest.

"It may be of interest to note that there are 18 working committees with a membership of 460, and 12 general committees with a membership of 104, giving a total of 564 persons in active N. E. L. A. work This total will be considerably augmented within a short time by representatives from the Brooklyn Edison Company.

"Our membership is approximately 2800, made up of key or leading men in the various companies. This is less than one in every ten employees. It is our thought that the ratio should be much better. There is place and opportunity for more."

WOMEN'S COMMITTEE

Miss Sophia Malicki, *Chairman* Miss Isabell Davie, *Secretary*

News Letter

By Mrs. Thelma Van Ness

ACCORDING to "The Oklahoma Meter," the Women's Committee of the Oklahoma Gas & Electric Company was recently invited by the home service department to visit its new electric bungalow built on the basement floor of the new O. G. & E. Building in Oklahoma City. The building is furnished and equipped just as any home would be. It is designed to show the extent electricity does and can play in the ordinary role of keeping a household. There are embodied in it all the latest designs in furniture, wall paper and fixtures. An auditorium seating 100 people is next to the bungalow and is available to groups of women and women's clubs as a meeting place. A program of food demonstrations and household management will be conducted by the home service department under the direction of Ruth Van Sant, director of the department.

* * *

To quote from the Sixth Round Table of the Kansas Women's Committee: "They did it in Nebraska—at Omaha! Devoted part of one meeting every month to getting acquainted with their commercial department's current specialty. They waffled in January, toasted in February, perked in March and ironed in April. Clear round the calendar they went via the electric appliance route and when the year was over an attractive booklet was prepared by each girl telling the virtues of this and that appliance. Prizes were awarded the three best tales. Write Johanna Truax, Nebraska Power Company, at Omaha, for further information."

* * *

A very interesting booklet comes from the Women's Committee of the Pacific Coast Electrical Association, entitled "How the Women's Committee Promotes Good Will," which contains the prize winning papers in the essay contest on that subject. Mrs. Ruth E. Creveling, chairman, women's committee of the Pacific Coast Electrical Association, was one of the judges. Helen Cowan of the San Joaquin Light & Power Corporation won first prize; Ethel E. Brockelbank, Los Angeles Gas & Electric Corporation, took second place, and Helen Y. Bragg, San Diego Consolidated Gas & Electric Co., was the third prize winner. Honorable mention was given to Miss O. C. Koch, Coast Counties Gas & Electric Co.; Mrs. Marguerite E. Kerline, Los Angeles Gas & Electric Corporation, and Mrs. E. A. LaMour, San Joaquin Light & Power Corporation.

* * *

A recent issue of the Florida Power & Light Company magazine contains an excellent article on "Electricity in the

Home," by Mrs. Helen Holmes of the executive department. This is an address delivered by Mrs. Holmes at a meeting of architects of Greater Miami.

* * *

A remarkable report comes from Morganfield, Ky. With only fourteen girls in this district of the Kentucky Utilities Company, the minutes of a recent meeting show some forty guests. This meeting attracted the most prominent people of the city and nearby towns. Present were lawyers, bank officials, city officials, newspaper editors, the president of the Kiwanis Club and members of the Women's Club. The Parent-Teachers' Association of the Morganfield graded school acted as hostess to the committee. Mrs. Priscilla F. Korb is chairman of this small but active committee and her work should be a real inspiration to other girls faced with the difficulties of a small group.

* * *

At a recent meeting of the Women's Committee of the Illinois Northern Utilities Company at Dixon, each girl took a guest. The purpose of the meeting was to bring about an understanding of the work of the committee. Miss Edna J. Decker is the chairman. All of the Dixon girls were present and each responded to roll call with an item of interest about the company or the industry.

* * *

Miss Esther Rockey, chairman of the East Central Division, reports some exceptionally good meetings of the Women's Committee of her division at Cedar Point-on-Lake Erie recently. Mr. C. I. Weaver, president of the East Central Division, and Mr. P. S. Arkwright, president of the N. E. L. A., both addressed one of the meetings. A very unique feature of the convention was the lampshade class conducted by Miss Mary Webber of Nela Park, assisted by the women of the Ohio Public Service Company, with Mrs. Ella Smethers in charge. This class was open to all women in attendance at the convention. Another meeting included reports by the State chairmen and talks by Miss Eloise Davison, home economics director of the N. E. L. A.; Miss Gladys Applebee, consultant, Electric League of Cleveland, and also A. Bliss McCrum, secretary of the Public Utilities Association of West Virginia.

* * *

In order that all the girls of the Northwestern Public Service Company, Huron, S. D., may see the list of articles of interest to Women's Committee members, Vera Bauman publishes this list in her bulletin.

* * *

The August number of "Cipsco News" reports that the program of the Central Illinois Public Service Company's division C seventh annual safety picnic included the playlet "Never Say Die," the director of which was Mrs. Maude Miller.

* * *

From the far West comes a communication of real interest. Miss Mary K. Walsh, past chairman of the Women's Committee of the Northwest Division, reported the results of a public speaking contest and two essay contests. She quoted Mr. George L. Myers, chairman, Public Relations Section, that division who exclaimed, "Again the women win." The women won the public speaking contest. Mrs. Mabel Maxwell, Portland Electric Power Company, Portland, Ore., was the winner of the contest, the subject of which was "Government in Business." Under the title, "Employees as a Factor in Public Relations," Miss Louise Wilmot, Puget Sound Power & Light Company, won the prize. In the contest under the subject of "The Women's Role in Public Relations," Miss Lula A. Boyes, Utah Power & Light Company, was the winner in the Class A, women's employees, and Mrs. W. H. McMurray, Pacific Power & Light Company, Yakima, Wash., in the Class B, wives of employees. Mrs. Winifred Reed won second place in the women's committee essay contest. Mrs. Reed is affiliated with the Washington Water Power Company, Spokane, Wash. Miss Fern Wheeler took third prize in this contest. She is with the Puget Sound Power & Light Company at Bellingham, Wash.

And here's another item from this very active group. The Women's Committee first aid team of the Portland Electric Power Company put on demonstrations every evening at a recent Electrical Exposition held by the Portland *Telegram*, one of the leading newspapers of Portland.

* * *

The chairman of the Women's Committee of the Kentucky Utilities Company, and also State chairman, Mrs. Beulah K. Yewell, believes in very complete and interesting reports of her meetings, including newspaper clippings, printed programs, and the actual minutes. Some fifty girls of the Kentucky Utilities Company recently held one of their "three-a-year" meetings at the Danville Country Club at Danville, Ky. Mrs. Henry Jackson, of Danville, chairman of the American home department, Kentucky Federation of Women's Clubs, gave the address, and Miss Helen G. McKinlay, Edison Lamp Works of General Electric Company, Harrison, N. J., talked on "Decorative Lighting for the Home." Others on the program were Mrs. Menna L. Jennings, of Paducah; Mrs. Priscilla F. Korb, of Madisonville; Mrs. Hattie A. Wood, Fulton; Mrs. Christine S. Smith, Morganfield; Miss Loretta Shine, Cynthiana; Miss Maxine V. Hydron, Louisville; Miss Velma G. Wilkerson, Franklin; Mrs. Nancy W. Burton, Louisville, and Mrs. Nellie D. Steenbergen, Paris Ky.

* * *

According to the Seventh Round Table of the Kansas Women's Committee, lamp campaigns are playing an important part in committee work in that locality. Grace Mitchell of the Kansas Power Company says they're breaking world's records in their campaign and the Kansas Gas & Electric Women's Committee is another group very much concerned with the "Fill the Empty Sockets" campaign.

* * *

Another Women's Committee number of a company magazine has appeared. "Power News," published in Indianapolis for the Indiana Gas Light Company, Indiana Electric Corporation, Attica Electric Company, Wabash Valley Electric Company, Northern Indiana Power Company, and the Mulberry Light & Power Company, is a clever publication full of interesting articles by the girls of these companies.

RELATED and other ORGANIZATIONS

Conference of Representatives of State Public Utility Information Bureaus

A MEETING of chairmen or representatives of state public utility information bureaus was held at the Electric Club, 30 North Dearborn Street, Chicago, the afternoon of Wednesday, Nov. 14. The meeting was called and was presided over by Mr. T. A. Kenney, Chairman of the Information Bureaus Committee. Eight bureaus had no representatives present, but were indirectly represented by representatives of holding, financing or management companies with which the major operating companies in those states are affiliated. It was the unanimous belief of the conference that the work being carried on by the bureaus should be intensified, that the bureaus should be given every possible support, and that the executives of the operating companies should give their personal attention to the conduct of the affairs of the bureaus.

Chairman Kenney, in opening the meeting, told briefly of the meeting of directors of the bureaus and of public relations men of holding and operating companies at Grand Beach, Mich., in August. He then called upon Mr. B. J. Mullaney for an address on the genesis and development of the information bureau movement. Subsequently he called upon chairmen, or representatives, of a large number of bureaus so that a general geographic picture of the sentiment regarding the work might be had by those present.

A feature of the meeting was a brief address by E. N. Hurley, former chairman of the U. S. Shipping Board and prior to that a member and chairman of the Federal Trade Commission. He spoke of the present investigation of the electric and gas utility industries before the Federal Trade Commission and emphatically denounced the attitude of the Commission, particularly with respect to its "fishing expedition" proclivities. He declared it as his opinion that the Commission is without legal authority to so conduct itself and that its activities in this respect at least are unconstitutional. He related an instance of similar activities on the part of an investigator for the Commission when he was chairman, which resulted in the immediate withdrawal of the investigator and a dismissal of the charges aganist the concern being investigated.

B. F. Weadock, special counsel for the Joint Committee of National Utility

Associations in the investigation before the Federal Trade Commission told briefly of the conduct of the investigation and plans for the presentation of the utilities' side of the case. Mr. Weadock was of the opinion that valuable as the work of the information bureaus had been to the industry in the past, it would prove to be of even greater value now and in future.

Mr. W. H. Hodge, a member of the special supervisory Publicity Committee of the Joint Committee of National Utility Associations, explained the purpose and functions of that committee and urged that the several state public utility information bureaus be utilized in presenting the true facts regarding the Federal Trade Commission investigation to the public.

Mr. W. W. Freeman declared that he is more than ever impressed with the value of the work of the bureaus, with which he has been in close contact in Ohio, and promised continued support by the companies he represented.

Mr. B. C. Cobb complimented the chairmen and representatives present on the excellent work which has been done even under the fire of the adverse criticism as a result of the Federal Trade Commission investigation. He heartily recommended continuance of the work, pledging his support.

Mr. W. A. Jones stated that in his opinion the work of the bureaus in future will be divided into two major parts: one informative work in presenting facts regarding the utility industry, and the other defensive work answering unjust criticism or attacks brought about through misrepresentation of facts adduced before the Commission or through the public press. He urged a definite program of aggressive defense, declaring that every unfair or unwarranted attack upon the industry through the press or otherwise should be answered. All Doherty companies, he said, will actively support the work.

Mr. C. E. Groesbeck announced that he, personally, is decidedly in favor of continuing the work of the bureaus and pledged the active and financial support of his company to the bureaus in those states where companies affiliated with the Electric Bond & Share Company are furnishing service.

Mr. George N. Tidd heartily concurred in the expressions of representatives of other holding, financial and managerial companies and reiterated the expression of others that the work of conducting the bureaus cannot be delegated but must be carried on by the executives of operating companies.

Mr. Britton I. Budd urged that a committee be appointed by Chairman Kenney to survey the work of the individual information bureaus with a view to making definite suggestions in each case, where necessary, as to ways and means of strengthening the work of the bureaus.

Mr. J. F. Owens addressed the meeting as Chairman of the Public Relations National Section of the N. E. L. A. He urged active and aggressive continuation of the work and thanked Chairman Kenney for his unselfish and untiring work as chairman of the committee, and indorsed the idea of having a committee appointed in line with Mr. Budd's suggestion.

At the request of Chairman Kenney, Mr. George F. Oxley spoke regarding the current work of the bureaus as a whole. He urged that executives on the committees take over some of the work which is now delegated to directors in many cases, particularly that relating to the financing of the bureau work. He urged that each bureau appoint some executive to be responsible for the financial support, thus relieving the directors of the necessity of constantly "selling" themselves and their work to the executives and soliciting funds for the support of the work.

Discussion of the bureau work and reports as to the opinion of company executives in their respective states regarding the continuance of the work were made by the following, who were called upon by Chairman Kenney and who in every instance asserted that the work would be continued more aggressively than ever before: Mr. F. J. Hanlon, representing the Iowa Committee on Public Utility Information; Mr. L. O. Ripley, representing the Information Bureau of Kansas Public Service Companies; Mr. E. H. Rosenquest, representing the New York State Committee on Public Utility Information; Mr. C. W. Tippy, representing the Michigan Committee on Public Utility Information; Mr. H. B. Flowers, representing the Louisiana-Mississippi Committee on Public Utility Information; Mr. Joseph B. Groce, representing the New England Bureau of Public Service Information; Mr. J. P. W. Brown, representing the Tennessee Public Service Information Bureau; Mr. N. S. Argabrite, representing the Virginia Committee on Public Utility Information and the Information Committee, Public Utilities Association of West Virginia; Mr. L. W. Scherer, representing the Oklahoma Public Utility Information Bureau; Mr. C. H. Elliott, representing the Rocky Mountain Committee on Public Utility Information.

Owing to lack of time, representatives of other bureaus present were not called upon individually, but it was the unanimous vote of the meeting that the work of the bureaus should be continued.

Subsequently Chairman Kenney appointed the following committee to survey the work of the bureaus and make suggestions for strengthening them and making their work even more effective than it has been:

B. J. Mullaney, Peoples Gas Light & Coke, Chicago, Ill.; W. H. Hodge, Byllesby Engineering & Management Corporation, Chicago, Ill.; S. J. Quinn, Electric Bond & Share Co., New York, N. Y.; Joseph B. Groce, the Edison Electric Illuminating Co. of Boston, Boston, Mass.; James M. Bennett, the Philadelphia Electric Co., Philadelphia, Pa.

International Chamber of Commerce Meeting

THE Holland-American Line S. S. Statendam has been designated as the official ship to carry delegates to the Fifth General Meeting of the International Chamber of Commerce to be held in Amsterdam, Holland, July 8-13, 1929.

The Statendam will land the American delegation at Rotterdam, Holland, July 7th. A special through train will convey the delegation direct to Amsterdam.

Details of the meeting and information regarding bookings, etc., should be addressed to Mr. John P. Gregg, Manager, American Section, International Chamber of Commerce, Connecticut Ave. and H St. N. W., Washington, D. C.

Texas Teachers Association Thanks Industries for Cooperation

THE following resolution of thanks to industries for cooperation was adopted by unanimous vote of the Texas State Teachers Association at their Fiftieth Annual Convention at San Antonio on December 1:

"WHEREAS, it is an established principle that the public schools, colleges and universities have the responsibility of training students for active participation in the duties of citizenship, and for taking their place in the productive activities of American industry, and

"WHEREAS, during the recent political campaigns the integrity and good judgment of school and college officials have been attacked because they voluntarily availed themselves of the offers of cooperation of various industries whereby students could be made acquainted with the basic economic, business and industrial conditions underlying the occupations in which they would later find employment, and

"WHEREAS, such cooperation with the industrial activities has been the result of our mature judgment, and actuated by an honest purpose to provide students with a type of practical information and training otherwise unattainable;

"THEREFORE, BE IT RESOLVED that the Texas State Teachers Association hereby reaffirm its purpose to make available to its students in the schools of Texas all available economic, business and industrial information which properly finds a place in the instructional program that may be obtained through the numerous legitimate sources of cooperative industrial channels;

"THAT we shall, as in the past, guard zealously our responsibility for providing a type of training which will develop our students an independence of attitude and freedom of judgment, upon which the well being of our public institutions depend;

"THAT we fully appreciate the educational value of legitimate cooperation with all industrial activities which place at our disposal, for our voluntary use, the essential information required for the well-rounded training of our students;

"THAT we express our appreciation for the cooperation Texas business and industrial institutions have consistently given us, and welcome a continuance of these efforts which enable us to give our students a deeper and broader appreciation of those factors so essential in productive American citizenship."

Interest in World Engineering Congress

INTEREST in the World Engineering Congress to be held at Tokyo, Japan, from Oct. 29 to Nov. 7, 1929, already great among American engineers, has been further stimulated by the presence in the United States of Dr. M. Kamo, dean of engineering at the Imperial University in that city, president of the Japanese Society of Mechanical Engineers and chairman of the organizing committee of the coming congress.

Conference of Utility Association Secretaries

By O. A. Weller

A UNIQUE movement was initiated by secretaries and managers of state, regional and national utility associations in June, 1923. In October of that year the first conference of those engaged in this work was held at Atlantic City in connection with the annual convention of the American Gas Association. From the modest beginning at that time when less than a dozen persons participated, there has now developed a well established and effective annual session designated as Conference of Utility Association Secretaries. The seventh session for this purpose was held in New York City, December 3, 4 and 5, 1928.

The purpose in coming to New York City was to get a close-up viewpoint of office systems and methods as employed by the American Electric Railway Association, the American Gas Association and the National Electric Light Association. Accordingly Monday, December 3 was A. E. R. A. day; Tuesday, A. G. A. day and Wednesday, N. E. L. A. day. The program for each day included an inspection of the office arrangement and methods used by the respective associations, and addresses by officers and staff members of each association. In this way all the secretaries in attendance secured a more thorough understanding of these national associations than could otherwise have been possible.

In addition to the messages by Lucius Storrs, Alexander Forward and Paul S. Clapp, who serve as managing directors of the three national associations, and the splendid reviews on specific lines of association research and service given by staff members, significant addresses were made by George B. Cortelyou, B. F. Weadock, J. F. Owens, O. C. Fogg and James B. Wootan. The subjects covered by these national speakers have to do with current problems faced by the various branches of the utility industry in the association represented.

Those present will always be indebted to these speakers for such expressions as the following:

"We should shape our course not so much with a view to escaping criticism as to avoid deserving it."—Geo. B. Cortelyou.

"Our vast country is now a single community. We cannot localize the effect of our acts. The amazing perfection of communication causes everyone everywhere to listen and to know. The burden of our work is to measure up to a high standard of conduct in each local community."—Paul S. Clapp.

"A misquoted statement may be corrected but it rarely happens that the second statement can catch up with the first and rectify it."—James B. Wootan.

Practically every state and regional association and geographic division, except in the extreme western sections of the country, were represented at this conference. About 65 persons were in attendance. From the opening session and throughout every speech and discussion there was a constant feeling of good will and friendly cooperation and a driving conviction that the job of those engaged in utility association work is to constantly strive for a more intelligent understanding of the problems and objectives of the industry in its several branches and to interpret this understanding for the benefit of Association members and the general public.

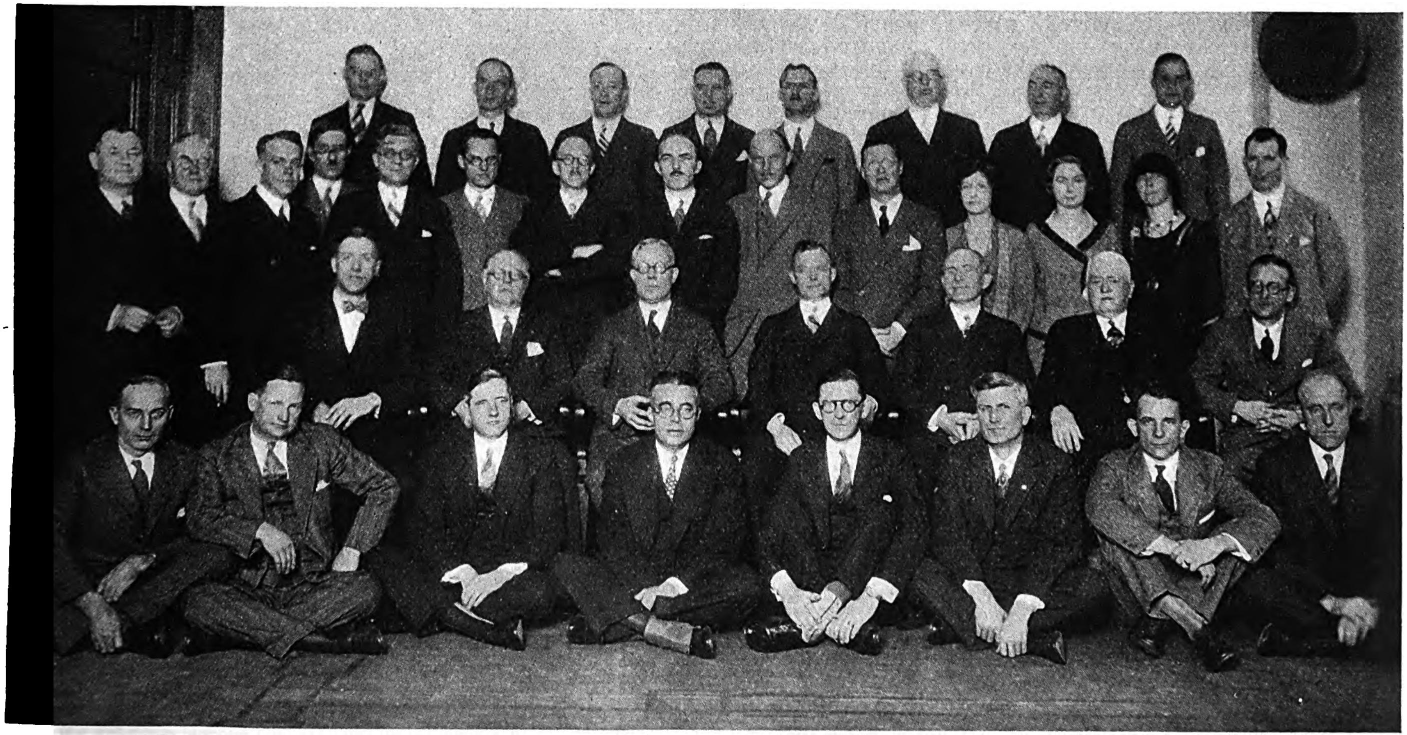
Edward F. McKay, Manager, Oklahoma Utilities Association, presided as Chairman of the sessions. To his personality and skill as presiding officer is to be credited much of the effectiveness of the Conference. O. A. Weller, Budget Director, Public Service Company of Colorado, Denver, who acts as Secretary of the Rocky Mountain Division, N. E. L. A., and of the Colorado Utilities Association served the Conference as Secretary. Officers elected for the ensuing year were O. A. Weller, Conference Chairman and Harold A. Buch, Secretary, Pennsylvania Electrical Association, Conference Secretary. Time and place of the 1929 session are Chicago, December 2, 3 and 4.

Illinois Society Plans Courses in Engineering

A NEW activity just started by the Illinois Society of Engineers is the handling of engineering extension work by a series of short courses, such as are conducted by some technical colleges.

New England Lighting Engineers Club Meeting

THE Lighting Engineers' Club of New England held its third meeting of the Season in Boston on November 20, 1928. An inspection of the new Keith Memorial Theatre and the new Cadillac Sales and Service Building was made.



AMONG THOSE WHO ATTENDED THE CONFERENCE OF UTILITY ASSOCIATION SECRETARIES

Front row: A. B. Campbell, John W. Lapham, C. E. Greenwood, A. Jackson Marshall, George F. Oxley, Thorne Browne, Wilgar Coleman, W. M. Carpenter. Second row (seated): O. A. Weller, E. F. McKay, J. W. Welsh, Paul S. Clapp, J. F. Owens, D. L. Gaskill, K. R. Boyes. Third row: J. B. Wootan, Fred W. Herbert, Fred C. J. Dell, J. W. McCloy, A. G. Schroeder, C. M. Kilian, G. W. Allen, H. A. Buch, H. M. Lyster, William Stokes, Miss Kathryn Herbert, Miss Isabell Davie, Miss O. A. Bursiel, E. N. Willis. Fourth row: S. F. Delaney, C. E. Earlywine, F. L. McKinney, Eustace Smith, Jr., Leslie Vickers, John N. Cadby, Herbert Sylvester, Charles W. Persons

International Conference on Bituminous Coal

By H. B. Lawrence
Henry L. Doherty & Co.

THE Second International Conference on Bituminous Coal, held at the Carnegie Institute of Technology, Pittsburgh, Pa., November 19-24, 1928, was attended by about 1800 engineers, scientists, industrialists and men of affairs. Some twenty nations were represented.

Low temperature distillation received the greatest attention. A projected K. S. G. plant which the International Coal Carbonization Co., a subsidiary of the International Combustion Engineering Corporation, is building at New Brunswick, N. J., was described at length. Dr. Soule stated that this plant had been patterned after the successful K. S. G. plant in Essen, Germany, where, since 1926, 50,000 tons of coal have been carbonized.

The New Brunswick plant will have a capacity of approximately 650 tons per day from eight retorts. A contract has been made with the Public Service Electric and Gas Company of New Jersey for the high calorific gas from the process. This gas will be blended with blue water gas, the final mixture to have a heat value of approximately 550 Btu. The tar from the process is to be sold to the L. J. Lewis Company and the coke will largely be sold for domestic fuel.

It was announced by Dr. Soule that the Lukens Steel Co. of Coatesville, Pa., had just contracted for a K. S. G. plant of approximately 560 tons daily capacity. In this plant, which will be the first in this country in connection with a steel works, the gas will be used for the heat treatment of steel, instead of the raw producer gas now used.

These two K. S. G. plants, which, when completed will be by far the largest in the world, indicate the extremely important advances made in the low temperature distillation field. They will be owned and operated by the International Coal Carbonization Co.

Dr. Soule stated that approximately $20,000,000 had been spent in fruitless attempts to establish commercially successful plants, and he pointed out the need of very careful analysis of conditions before entering into large scale operations.

It should be noted that no claims are being made for the K. S. G. system for the preparation of fuel to be used under boilers in power stations.

Mr. W. H. Allen, Jr., stated that the results realized at the Philo plant of the American Gas and Electric Co. with the "Carbocite" process have been sufficiently successful to warrant further study. The experiments carried out at South Bend and Philo have produced a good grade of domestic fuel, which is being favorably received in the domestic market. Under the present methods of operation about 20 per cent of the char goes through a ½ in. mesh. Studies are being made to reduce this percentage of fines.

At Moundsville, West Virginia, the Ben Franklin Coal Co. is operating a plant, using the Hayes process to convert slack coal from mining operations into domestic fuel, tar gas and light oils. The slack used is Pittsburgh No. 8 coal running approximately 39 per cent volatile, 51 per cent fixed carbon, 7½ per cent ash and 2½ per cent moisture. The products of the distillation were given as approximately 1430 lb. of coke, 29 gal. of tar, 2.1 gal. light oils and 3750 cu. ft. of 800 Btu. gas from 2000 lb. of coal.

It was stated that approximately 40 per cent of their coal mined is slack and in order to find a market for this material, which normally could not be sold for more than one-half the price of the screened product, they turned to low temperature distillation as a possible means of making a domestic fuel from this material. It is possible to operate the plant in conjunction with city gas plants, firing the retorts with producer gas, thus making the gas from the process available for commercial use.

In the foreign field progress in low temperature carbonization is also being made, but before making comparisons between the practice in the United States and abroad, it is necessary to give careful consideration to the economic conditions, natural resources, labor, habits, tariffs and subsidies in each particular field.

Enthusiastic attention was given to the subject of low temperature distillation, especially in its possible relation to utility operations, by the coal operator, the smoke abatement expert and the industrial concerns whose processes can be performed better and cheaper by making use of low temperature distillation products.

The world production of coal is approximately 1,200,000,000 tons per year of which the United States furnishes about 500,000,000 tons and Great Britain about 250,000,000 tons.

Due to conditions in the coal mining industry a large amount of research and scientific endeavor is being devoted to restoring this basic industry to a more wholesome state.

The demand for power in the United States is being met as follows:

	Per cent
Bituminous Coal	50.3
Natural Gas	5.8
Oil	21.4
Water Power	6.3
Firewood	5.5
Anthracite	8.1
Animal Power	2.5
Wind Mill	0.1
Total—	100.0

Between 1917 and 1927 bituminous coal production in the United States decreased 6 per cent, anthracite fell off 20 per cent, the total decrease in production being 8 per cent. In the same period oil production increased 169 per cent, natural gas 82 per cent, water power 110 per cent, so that the total production for coal in the United States for power purposes increased 18 per cent between 1917 and 1927.

Concurrently with this increase of fuel for power, there have been very important changes in markets and efficiency. Natural gas and petroleum have increased rapidly and bunker coal has shown a falling off. For locomotives the unit of production fell from 540 in 1904 to 380 in 1927 and this marked increase in economy has had its effect in reducing mining activities.

Of the total coal mined in the United States, locomotives use 27.7 per cent, electric utilities 7.7 per cent, coke ovens 16.0 per cent, steel works 5.4 per cent, coal gas industries 1.0 per cent, general manufacturing 20.8 per cent, domestic and other fuel 19.2 per cent and chemical and fertilizer plants 2.1 per cent.

In the electric utility field the output has grown from 5 billion Kw-hr. in 1902 to 90 billion in 1927, but along with this marked increase in output there has been made a most enviable record in the reduction of coal used per Kw-hr., the coal rate falling from 6.3 lb. per Kw-hr. in 1902 to 1.9 lb. per Kw-hr. in 1927. The average can be still further decreased because there are already in operation, large stations generating a Kw-hr. on approximately one pound of coal.

Such increase in economy for industries using 35.4 per cent of the fuel, has affected the coal mining industry and neither time nor money are being denied by the coal industry in the endeaver to meet the new conditions. The importance of this matter can hardly be overemphasized as the economic and social life of large areas is affected.

The papers on "Power" and "Combustion" were of interest and indicated that some really worth while information is being crysallized into tangible form.

The suggestions on ash melting, carbon losses, clinkering of, and fusion points of ash should be of especial interest to the power plant engineer. The present methods of taking fusion points of ash, analyses of furnace gases, handling of ashes, prevailing carbon losses and character of mixed fuels were discussed and suggestions made that may be a guide to better understanding of these subjects.

Pulverized fuel and stoker furnaces had their place in the meetings, and questions of temperature, time, turbulence and fineness received consideration. Dr. Rosin of Germany gave an extremely interesting paper on the "Theromodynamic Bases of Pulverized Coal Combustion" which brought out some of the points on fineness, temperature and time of combustion to which American engineers have devoted so much time.

Other papers described some of the important pulverized fuel plants in the United States an outlined developments that have taken place in the continued effort for higher ratings, better efficiency and lower initial capital investment.

Perhaps the most interesting papers, in so far as the small plant, railroad or marine man is concerned, were those presented by Mr. C. J. Jefferson of the United States Shipping Board and Commander J. J. Broshek, U. S. N., on the adaptation of pulverized fuel firing to marine work. The tests on the S. S. Mercer, a 9500 ton cargo vessel were given in detail.

Extremely interesting and illuminating contributions were presented on Gas, Gas Purification and Cleaning, Origin, Composition, Classification and Liquification of Coal, Tar and Oil, Fertilizers, and High Temperature Distillation.

It is a pity not to give some outline of the important work on hydrogenation, handling of pulverized fuel, the syntheses of various materials, etc., but lack of space prevents. The proceedings of the Conference will be published in two volumes and will cost $15.00.

Rural Electric Division, A. S. M. E. Meeting

By Ralph A. Palmer

A TWO-DAY program on rural electrification which sustained the interest of the engineer-audience till the final adjournment, was presented by the Rural Electric Division of the American Society of Agricultural Engineers, in Chicago, December 6 and 7. The rural service departments of the public utilities throughout the country, and particularly the middle west, were well represented.

The too often neglected farm wiring problem was handled by H. S. Hinrichs, agricultural engineer for the Kansas Power and Light Company and by H. H. Weber of the Rome Wire Division of the General Cable Corporation. A lively discussion following the papers, and numerous citations of uneconomical, inadequate and dangerous installations, showed the problem to be acute.

G. A. Rietz, district specialist in rural electrification for the General Electric Company, gave practical information on the subject of motor installation and pointed out that the performance of a motor is affected by the design of farm buildings and of the driven machinery. J. P. Schaenzer, field agricultural engineer of the Wisconsin rural electric project, presented a paper on the "Installation of Water Systems."

"Feed Grinding on the Farm," an illustrated paper by E. R. Meacham, manager of the rural service department, Wisconsin Power and Light Company, was the first paper given after luncheon, December 6. Other papers on the afternoon program were "Research in Rural Electrification," by W. T. Ackerman, director and engineer, New England Rural Electric Project; "Retail Dairy Refrigeration," by Truman E. Hienton, project leader in rural electrification, Purdue University; "Seed Corn Testing," by E. W. Lehmann, professor of farm mechanics, University of Illinois, and "Ventilation by Electric Fans," by G. C. Breidert, sales promotion engineer, Ilg Electric Ventilating Company.

The morning of December 7 was taken up by a series of round-table discussions on "Rural Load Building by Merchandizing," "Demonstrations and Exhibits," "Silo Filling," and "Grain and Feed Elevators."

Through the courtesy of the Public Service Corporation of Northern Illinois, the afternoon session was given to an inspection of the model farm of that company in Lake County.

A. E. S. C. Becomes American Standards Association

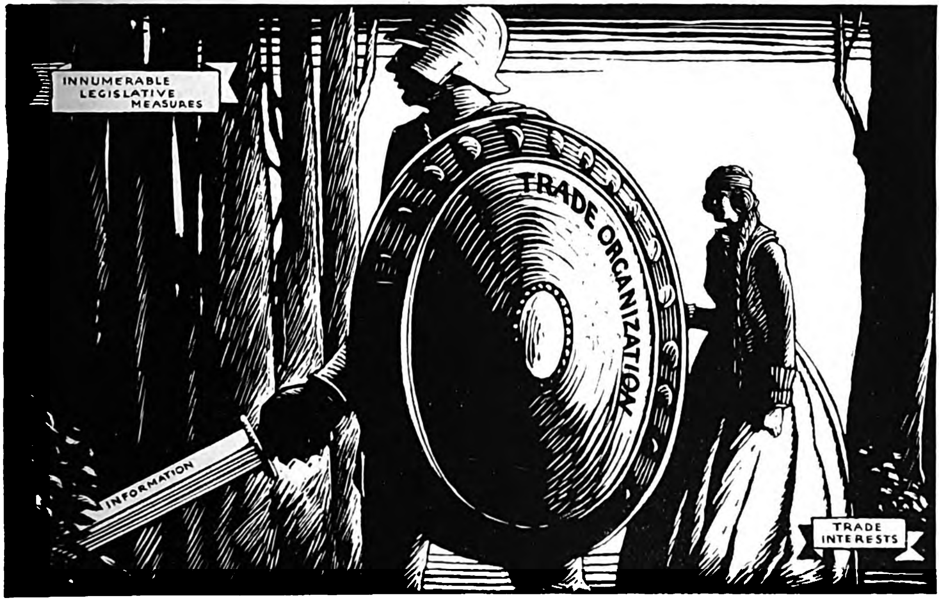
UNANIMOUS approval by the thirty-seven member bodies of the establishment of the American Standards Association to succeed the American Engineering Standards Committee, is announced by William J. Serrill, assistant general manager of the United Gas Improvement Company of Philadelphia. Mr. Serrill was chairman of the Standards Committee, and now becomes president of the American Standards Association. One of the most important results of the abandonment of the committee form of organization will, according to Mr. Serrill, be a much greater degree of participation by trade associations in the direction of the national industrial standardization movement.

The new body will not formulate standards, but will provide systematic means by which units in industry, when they find it necessary to set up standards, may come together for the purpose of formulating them.

The *Almost* Perfect Book

ALARMED by the failure of volunteer proofreaders to report errors in the "Code for Electricity Meters—Third Edition," published last May by the N.E.L.A., K. M. Elish, Editor of Publications, recently inquired of Dr. J. Franklin Meyer, U. S. Bureau of Standards, what errors had been discovered. Dr. Meyer, who headed the committee which revised the Code, made the following reply: "I have received no notice from anyone of errors in the Code."

Thus is challenged the ancient printers' dogma that no book is errorless, and another example given of what an editor can do when subjected to pressure by a committee that reads proof carefully.



Reproduced courtesy, The Kiwanis Magazine

Surges and Flash Overs

By Fred W. Herbert,

Director, Service Department
NELA

There is no mystery or black magic in the electric industry—just plain horse (power) sense.

* * * *

When the wagging tongue of a dissatisfied customer is converted by satisfactory service to a warbling tongue of praise, two things have been accomplished, one is the knocker has been changed to a booster.

* * * *

More and more property is becoming exempt from taxation and this places an increasing burden on the property that is not exempt.

* * * *

The electric industry not only talks of its abilities but it demonstrates them.

* * * *

Statistics cannot take the place of judgment.

* * * *

When a complaint desk gets the word, "We are all out of juice," watch your step. It may not always mean what you think it means.

* * * *

Trying to make customers out of friends is a natural plan, but making friends out of customers is a much wiser procedure.

* * * *

In our public relations we give out friendship, then we expect to get it and if you fail to receive friendship, keep right on giving, for the law of averages will win out.

* * * *

Plant and equipment are tangible assets, but "good will" is that intangible something that keeps plant and equipment going.

* * * *

What is the connection between Easy Street and Easy Payment Street—Simply an extension.

* * * *

What does buying comfort mean —Buying electric appliances of course.

* * * *

Statistics are those irrefutable figures the great orator makes up as he goes along.

* * * *

People accept you for your "face value" when you look pleasant and reject you when you look ugly.

* * * *

No matter how compelling your advertisement, how well dressed your windows, how inviting the threshold of your shop, all the care expended upon these important sales helps is greatly discounted if, when you are face to face with the customer, your deportment is not in keeping with the external qualities which induced him to come into the shop.

* * * *

A college education never hurt anybody who was willing to learn something afterwards.

FACTS and FIGURES

National Statistics of the Electric Light and Power Industry

As the result of the cordial cooperation of some 380 electric light and power companies in the United States in returning to the N. E. L. A. their monthly report of operating data, the association will soon be in a position to furnish, each month, a summary of the more important statistics of the light and power industry of the country.

The following form has been drafted in accordance with the suggestions and cooperation of the Statistical Committee of the Accounting National Section.

Proposed Form for Publishing of Monthly
NATIONAL STATISTICS
of the
Electric Light and Power Industry
Statistical Department—National Electrical Light Association

	This Year	Last Year	Per Cent Increase
Final Data for Month of			
Monthly Data			
*Kw-hr. generated plus kw-hr. received from other sources	....	....	....
*Generating capacity (kw.)	....	....	....
Total number of customers			
Number of farms served	....	....	....
Number of domestic customers served	....	....	....
Sales of Energy (Kw-hr. sold)			
Farm service	....	....	....
Domestic service	....	....	....
Commercial service			
Small light and power (retail)	....	....	....
Large light and power (wholesale)	....	....	....
Railways and railroads (motive power)	....	....	....
Other sales to ultimate consumers			
Total sales of energy to ultimate consumers	....	....	....
Total revenue	....	....	....
Data for Twelve Months Ending			
*Kw-hr. generated plus kw-hr. received from other source	....	....	....
% generated by water powers	....	....	....
Lbs. coal per kw-hr.	....	....	....
Domestic Service (residential use)			
Average annual consumption (kw-hr.)	....	....	....
Average price per kw-hr.	....	....	....
Preliminary Data for Month of			
Monthly			
Kw-hr. generated plus kw-hr. received from other sources	....	....	....
Generating capacity (kw-hr.)	....	....	....
Total number of customers	....	....	....

*By courtesy of U. S. Geological Survey, with deductions for plants not considered electric light and power enterprises.

It is proposed to make this report a feature in the "Bulletin" each month and beginning with the next issue, data for the month of September or October will be published. Comparative monthly data, however, will not be available until the January, 1929, reports have been summarized.

Due to the time required to receive the monthly reports from the companies and to summarize and extend them for the entire industry, it is proposed, as suggested in the above form, to issue final data for one month and preliminary data for the succeeding month.

It now requires approximately sixty days for all of the reporting companies to file their monthly report forms. As time goes on, however, it is hoped that the companies will be able to forward the reports to us so that final figures will be published not later than thirty days from the close of the month.

Capital Requirements of E. L. & P. Industry

The capital requirements of the light and power industry for extensions and improvements is graphically illustrated by figures given by the Statistical Research Department of the National Electric Light Association in a comparison of expenditures during the past three years with the expenditures of the railroads. The gross amount spent for new construction by these two branches of public service during this period is as follows:

Year	Spent by Railroads	Spent by Electric Light and Power Companies
1926	$885,086,000	$772,515,000
1927	771,552,000	793,744,000
1928 (estimated)	650,000,000	800,000,000
Total	$2,306,638,000	$2,366,259,000

An analysis of the expenditures of the light and power industry shows that more than twice as much is spent for the purpose of getting the current to the consumer as is spent to generate it. More than twice as much is spent for plants generating by steam than is spent on water power plants. The investor's dollar is being split up by the industry approximately as follows:

For steam generating plants	19.7 cents
For water power plants	8.8 "
For transmission lines	17.7 "
For distributing systems	27.7 "
For sub-stations	15.0 "
Miscellaneous	11.0 "
Total	$1.00

Public Utilities Make Best Showing

While 33 per cent of all the public utilities in the United States (exclusive of transportation) reported no net income for the year 1927 to the Bureau of Internal Revenue, an analysis of the figures by the Department of Statistical Research of the National Electric Light Association shows that these companies received only 5 per cent of the total gross income. In other words, while only 67 per cent of the companies earned a net revenue, these companies represented 95 per cent of the production. This is a better showing than that made by any other industry.

It is interesting to note that, while the average gross revenue of the companies reporting net earnings was $425,750, the average gross revenue of the company reporting no net income was only $47,100. This is one more indication that the day of the small isolated public utility is over. The trend of the average unit rate for the whole United States has been steadily downward for years, and with greatly increasd operating expenses it is only the large system that can show adequate returns on the money actually invested in the public service. The isolated plant has a relatively much higher unit cost of production, and in the face of the public demand for lower rates and continued improvement in service it cannot charge a rate which will pay a fair return on the value of the property.

The left hand side of the following table, prepared by the Statistical Research Department of the N. E. L. A., shows for various industries the per-

(*Continued on page* 62)

The Far Reaching Significance of Power Plant Efficiencies

By H. S. Bennion

Director of Engineering, N. E. L. A.

THE large industrial centers of the United States, generally speaking, are today served by steam generated electric power. Absence of water power possibilities makes more complete their dependence on power from fuels to supply the increased needs of the future. At the present time steam generating capacity is being installed in the United States three and a half times as fast as water power and this ratio is increasing.

Fortunately for these large centers primarily dependent on steam power, the history of the past 100 and more years gives promise of a long continued improvement in the art of producing such power.

The development of the steam engine by James Watt 160 years ago represented a tremendous advance in the harnessing of energy for the use of mankind and yet practically all of the energy in the fuel burned in those early steam engines went up the smokestack into the ash box or out of the exhaust pipe. From an almost negligible percentage, the overall efficiency—boiler and engine—has climbed slowly by one improvement after another until today the average better class steam station has an overall efficiency of over 25 per cent, and the latest and best plants have developed efficiencies a little over 31 per cent.

The chart (Fig. 1) shows the long slow climb over a span of a century and a quarter of the efficiency curve of steam power equipment. More than that, it shows the long distance yet to climb to reach perfection or 100 per cent efficiency. How rapid the climb will be and how near to 100 per cent will ultimately be attained is beyond the power of anyone to predict, but the record of the past promises well for the future of power supply in the industrial cities of the United States.

A second chart shows the range of coal prices of the past 25 years, and, for the same period, the corresponding fuel cost per kilowatt-hour generated.

The third chart shows for the 25-year period the pounds of coal needed to produce a kilowatt-hour of electrical energy. This curve translates into concrete and understandable terms and figures the direct advantages of the rising efficiency curve of the steam turbine and its boiler. In other words, the rise in the curve of efficiency is accompanied by an equivalent drop in the number of pounds of coal per kilowatt-hour.

These curves, recording as they do the compounded benefits from many improvements in power plant machinery, partly explain the downward trend of the electricity in the face of generally rising costs. Coal now costs three times what it did in 1905 and yet the fuel cost per kilowatt-hour of electric energy generated is the same now as it was then—thanks to increased mechanical efficiencies.

As each new development in combustion, in the production of steam, in the saving of waste heat, in condensing of steam to produce vacuum, and in the prime mover itself has been exploited

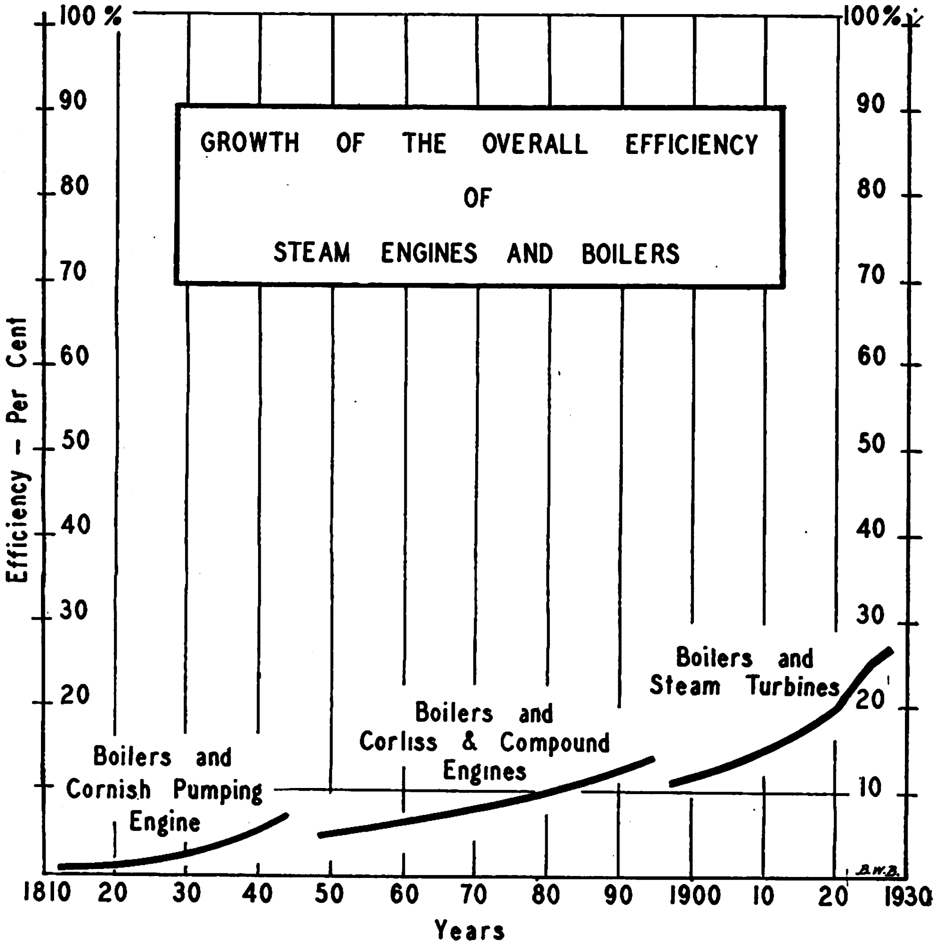


Fig. 1

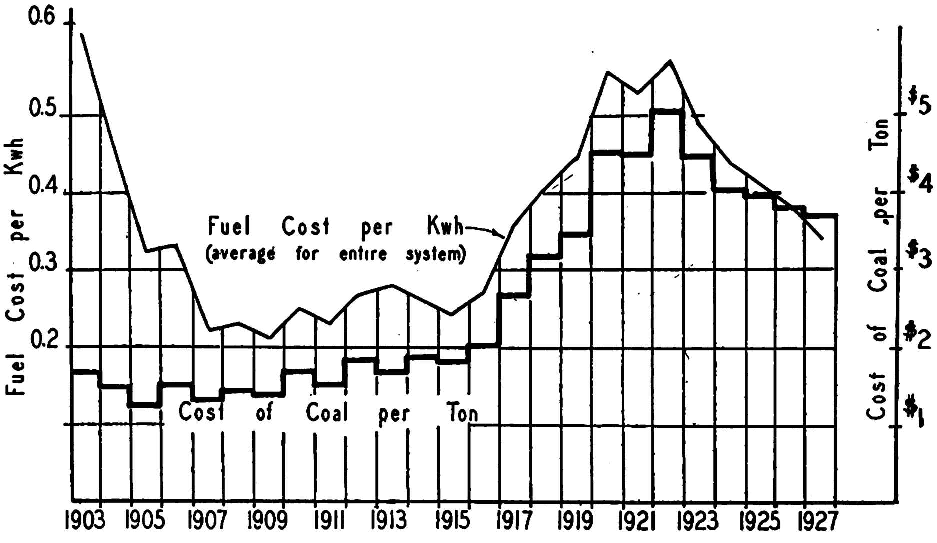


Fig. 2

and brought closer to perfection, it has seemed that the possibilities for further improvement in overall efficiency were nearing exhaustion, but there is yet so much room for improvement and improvements have been coming along so consistently that it may be taken for granted that they will continue to come. It is believed by those closest to the development field that efficiency in steam power production will climb in the next fifteen years about as far as it climbed in the past.

Turbine Efficiency Near Top

A fourth chart is added to show that the hydraulic turbine—the prime mover of the hydraulic power plant—has been perfected until it is now near the top. It is practicable to increase its efficiency a fraction of a per cent here and a fraction there but it is too near the ultimate to leave room for much improvement.

Turbine efficiency is of course but one factor in the cost of developing water power. Most of the other factors likewise hold out little or no promise of future development. Foremost among these is the increasing difficulty of meeting all the demands or satisfying all the interests which are attached to rivers and streams. The importance of streams for water supply, for fishing, for park and recreational purposes, for irrigation, together with the possibility of benefiting navigation and controlling floods, now have to be reckoned with more seriously than ever in the past as the interests affected by each of these uses or purposes become more pronounced.

The problem of coordinating the development of streams best to serve all purposes is rendered more difficult at the present time by the fact that the public generally holds an exaggerated view of the value of water power sites as revenue producers. This condition is readily explained by the fact that a lag of five to ten years is required for the public to become educated to a change in economic conditions, and the changed relation between the cost of steam-generated power as compared to hydro-electric power generation has been too rapid for the public to catch up with it. In a few more years the public's misconception will correct itself. The problem of coordinating the many uses of a river or stream will, however, remain because of inherent difficulties which are growing in magnitude with time. The chances of working out a scheme that will win approval become less and less.

Water Power Development to Decline

As shown by the last report of the Federal Power Commission, the rate of development of water powers has continued up to the present with very little abatement. This would seem to contradict what has just been said. This continued rate of development has largely been due, however, to the impracticability of closing out large development programs in the short space of three or four years. It is noteworthy, however, that at the present time on the entire Pacific Coast the construction programs for 1929 call for several steam plants, and no important water power developments are included. It may confidently be predicted that another five years will show a marked reduction in new water power developments and still greater dependence on steam, with an added urge to improve the efficiency of steam power production.

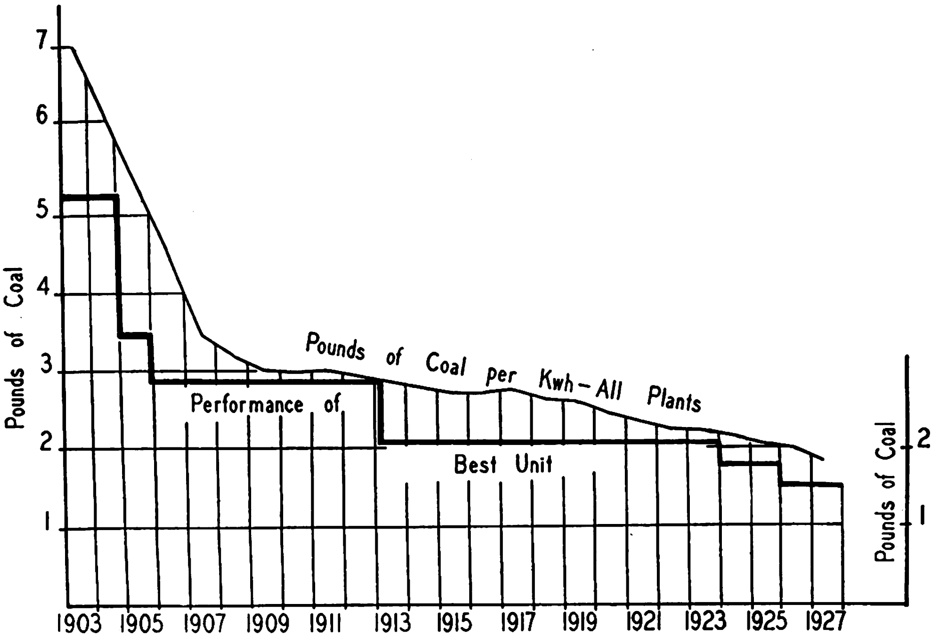


Fig. 3

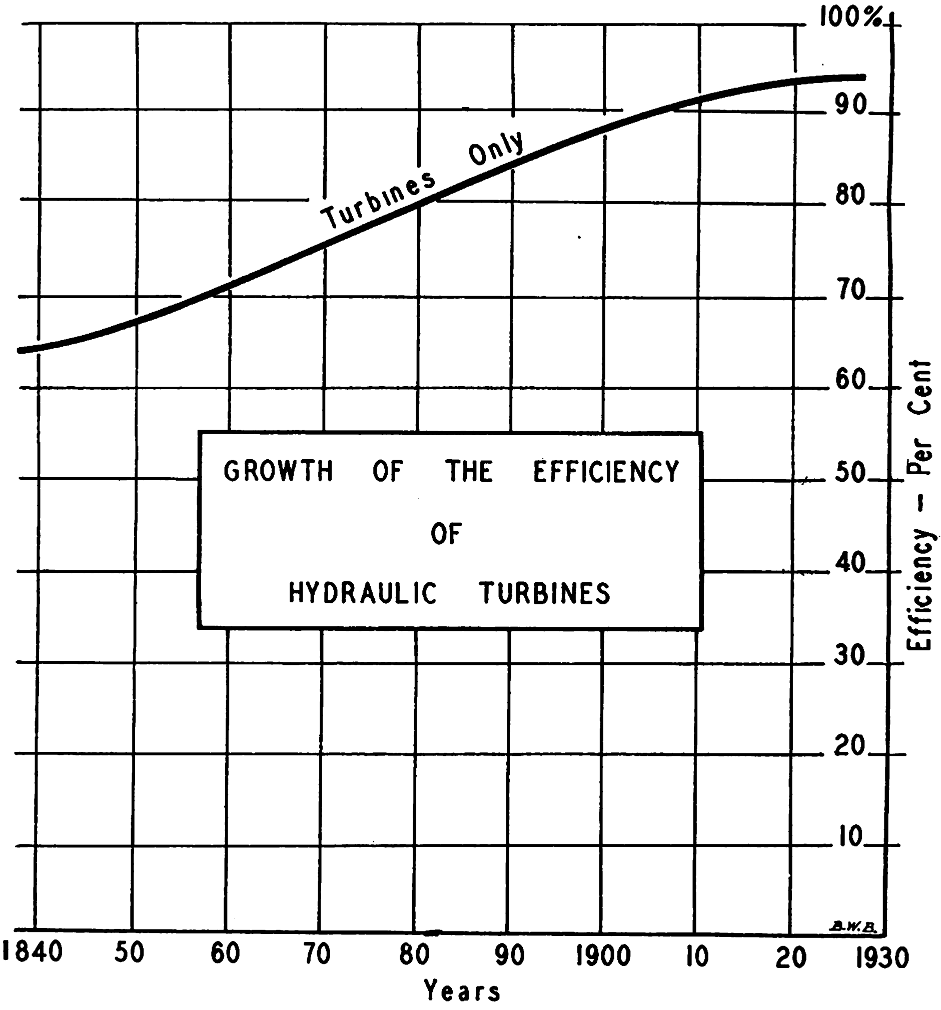


Fig. 4

Picked up from

ELECTRICAL NEWS ITEMS

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Cost of Lighting Streets

LIGHTING the city streets of the United States is an undertaking of amazing ramifications that devolves upon thousands of companies and an untold amount of equipment, as well as electric power from steam and hydro-electric plants. An attempt at calculating the benefits of this service would lead one into a maze of advantages and an added realization of the contributions of the electrical art.

Yet, what does this cost? What is the annual expense for the electricity that lights the street lamps of the nation? The bill for current for this purpose amounted in 1927 to slightly more than 68 million dollars, which is practically the same amount that was spent last year for dentifrices, perfumes and face powders by the people of this country. These latter figures are from a statement, dated November 20, 1928, from the Bureau of the Census of the Department of Commerce. For dentifrices and perfumes the nation's bill last year was more than the total bill for the electrical energy required for the motive power of all the street and interurban railways. Shampoos and depilatories cost about as much as the electrical power for all the electrified steam railroads.

Domestic Consumers Subsidized at Expense of Industry

THE Toronto (Canada) Globe of October 29th tells us: "Hydro officials (Officials of the Hydro-Electric Power Commission) point out that the system is not falling behind, but that they consider householders are getting current at less than cost, while commercial users are paying about $800,000 a year more than they should." However, it seems that adjustment of the Toronto rates, increasing the rates of small householders, will not take place before the end of the year and may be indefinitely deferred.

Light and Power authorities have long insisted that the domestic consumer of Ontario is being subsidized at the expense of the industrial and commercial power user. It is something to have the Hydro-Electric Commission admit it.

The Swiss Federal Railway System

THE Swiss Federal Railways have at various times been referred to as outstanding examples of successful government operation of utilities. Nevertheless these roads have been encountering difficulties in making ends meet, according to C. E. R. Sherrington, Secretary, Railway Research Service of the University of London.

The present tendency in Europs, he has pointed out, is to sever the relationship previously existing between the state railways and the financial affairs of the different governments. This was found necessary because the railroads were leaning too heavily on the national budgets.

Discussing the Swiss Federal Railways, the total mileage of which is 1,837, with about 627 miles electrified, Mr. Sherrington, as quoted in the December 14 issue of *Railroad Data*, said:

"The efficient Swiss Federal Railways are deservedly chosen by many as the ideal at which State-owned and operated systems in Europs should aim. Its economic studies, notably those dealing with the comparative advantages of steam and electric traction, have been the object of envy by many railway managements, and have provided very valuable data for similar studies in other countries. For some years the railway budget has been separated from the Swiss national budget.

"It is estimated that the financial results of 1927 may close with a deficit of 12 million francs, which would include 7 millions for amortization of deficits unavoidably incurred during the war period.

"During the ten-year period, 1915-1925, their railway debt has risen about 1,000 million francs. Thus, in spite of efficient management and the adoption of courageous policies, the Swiss Federal System is no exception to the State-operated systems showing no profit."

Why the Industry Will Prosper

MR. HENRY A. PORTER, research editor of the *Magazine of Western Finance*, lists the reasons advanced by competent authorities as to the certainty of continuous growth and prosperity in the electric light and power field as follows:

1. Less than two-thirds of the population of the United States live in homes which use electricity.
2. Less than 50 per cent of the homes wired for electricity use any domestic electric appliance except the flatiron.
3. The use of electricity in the home would be increased more than 1,000 percent if homes were equipped electrically throughout.
4. Less than 10 per cent of the farms in the United States use electricity in any form.
5. Less than 1 per cent of the entire railroad mileage of the United States is electrified.
6. The lighting of the nation's great network of highways and airways will prove a large source of new revenue.
7. Radio broadcasting, and the radio with an electric socket, have opened up a new field for consumption of current.
8. Present use of electric power by industries is less than 50 per cent of their actual power requirements.

Electricity in the Medical Field

AN announcement comes from Chicago that Dr. W. T. Bovie, head of the Department of Biophysics at Northwestern University, has been awarded the John Scott Medal and a premium of $1,000 by the City of Philadelphia for his work in the field of electro-surgery. The apparatus which he has developed makes possible surgical operations with an electric current instead of a knife. Operations performed in this way are entirely free from pain or surgical shock. For example, growths on the brain can be removed while the patient is fully conscious and aware of what is going on. The electric current not only makes the incision, but at the same time it closes the blood vessels so that even in operations usually accompanied by great loss of blood, no bleeding occurs.

The work of Dr. Bovie is only one more of the many tremendous contributions which have been made to the medical profession and to surgery by electricity. It will be recalled that when he occupied the Chair of Biophysics at Harvard University he conducted many experiments with the ultra-violet ray with the cooperation of President C. C. Little of the University of Maine. The ultra-violet ray is of particular value in the curing of rickets, a disease of the bones. Statistics show that between 95 and 100 per cent of the babies raised in large cities are more or less afflicted with it.

Another important development is an air compressor device used to draw the dangerous diphtheria membrane from a patient's throat and thus prevent strangulation. It is a delicate machine and has been used successfully in removing cataracts from the eye. Still another is the diathermia apparatus used in the treatment of pnuemonia and other diseases where it is necessary to generate internal heat.

The importance of the X-Ray not only in the treatment of disease but in diagnosing is known to every one. This has been developed to such a stage that the doctor in a small community or rural district can carry a portable machine to the patient's bedside, take a picture, send it by wire or radio to the specialist in a distant city and in a few hours have the benefit of his advice.

Another interesting apparatus is the electric stethoscope, a product of the investigations which are being constantly made by the Bell Telephone Laboratories. Every sound of the heart tells its story to the expert diagnostician and the electric stethoscope greatly magnifies these sounds. The most impressive application of this is in connection with the cathoderay oscillograph which makes it possible to see the graphic representation of the pulsating heart. This enables the physician or group of physicians to check hearing against sight in diagnosing.

ON page 731, December N.E.L.A. BULLETIN, in a group photograph the seated figure of Mr. W. T. McCaskey of the Middle West Utilities Company was erroneously captioned S. I. McElhoes, Counsel, Southwestern Light and Power Company. As one of the gentlemen involved has already expressed pleasure over the mixup and the other is expected to, an editorial apology would perhaps be out of place.

WHAT OCCURRED LAST MONTH

Consolidations

The Rochester, New York, Central Power Corporation has filed with the Public Service Commission of New York a petition for permission to acquire the outstanding common stock of the Lake Ontario Power Corporation, which serves a number of communities in New York State. The New York Public Service Commission has approved the transfer to the New York State Electric Corporation of the Morris, New York, Light and Power Corporation.

* * *

The Cities Service Company of New York has bought from the Central States Power and Light Corporation the Tecumseh, Michigan, Electric Company. The Central States Light Corporation has bought the Independence, Iowa, plant, formerly the property of the Northeastern, Iowa, Power Company.

* * *

The consolidation of the Delaware Public Service Company and the Delaware Electric Power Company was approved by the stockholders of both companies on Dec. 3.

* * *

On Dec. 10 was announced the formation of the Utilities Public Service Company, which is to acquire a group of companies valued in excess of $11,750,000. The company has attained control of the Associated Public Utilities Corporation and the Standard Service Corporation, through which service will be supplied to 171 communities in ten States.

* * *

On Dec. 11, the W. N. Albertson Company of Omaha announced the purchase of control of forty-one utility properties in North and South Dakota, North Carolina and Wisconsin.

* * *

Stockholders of the Northern Ontario Light & Power Company and of the Northern Canada Power Company, subsidiaries of Canada Northern Power Corporation, have approved the merger recommendation of directors.

* * *

The Newport, Vt., Electric Light Company has been acquired by W. B. Foshay & Company, Minneapolis.

* * *

The majority of the common stock of the North American Water Works & Electric has been acquired by the Atlantic Public Utilities.

* * *

The National Utilities Company has sold to the Georgia Power Company the electric plant at Manchester, Ga.

* * *

On December 1 the consolidation of three public service companies of Macon, Georgia, with the Georgia Power Company became effective.

* * *

The Federal Trade Commission's Investigation

Among the resolutions adopted by the American Federation of Labor at its convention at New Orleans was one opposing "all efforts of private and public service corporations and of real estate boards and other private corporations to inject covert propaganda into the public schools and universities." The National Grange, in session at Washington, D. C., Nov. 24, adopted a resolution opposing the "policy of the power trust in making use of our institutions of public education to carry on propaganda designed to further its interests."

* * *

On Dec. 1, the Federal Trade Commission filed in the Federal Court for the Southern District of New York an application asking for an order to require officers and employees of the Electric Bond and Share Company to produce certain records heretofore refused by the company, and to answer certain questions which were propounded at a Commission hearing and which witnesses then declined to answer.

* * *

The budget sent to Congress by the President on Dec. 5 calls for $262,000 for the Federal Trade Commission's investigation of the utilities and a chain store inquiry.

* * *

On Dec. 5 Senator Walsh of Montana introduced two bills, one forbidding any person, firm or corporation engaged in interstate commerce to offer or give anything of value to any teacher or member of a school board to induce him to write or revise textbooks or printed matter for schools or to teach any doctrine to influence opinion in favor of a policy advocated by such person, firm or corporation; the other bill provides that no publication claiming second class postage rates shall print any reading-matter for pay or furnished in substance by any person, association or corporation paying for display advertising in such publication, knowing it was so furnished, unless the fact that it was so provided or paid shall be plainly indicated.

* * *

The annual report of the Federal Trade Commission, sent to the Senate and House on Dec. 10, gives an outline of the progress of its utilities investigation.

* * *

On December 17 the Federal Trade Commission sent to the Senate its ninth interim report on the utilities investigation. This contains the statement that public hearings will be resumed early in January if court engagements permit. On December 8 Senator George, whose amendment to the Walsh Resolution caused the investigation to be conducted by the Federal Trade Commission instead of by a Senate committee, declared that the investigation thus far has rendered "an excellent and helpful service to the American people and to honest American business."

* * *

Hydro-Electric

On Dec. 2, the Federal Power Commission issued its annual report. This calls attention to the lack of adequate personnel which is preventing the proper functioning of the Commission and makes certain suggestions in regard to the regulation of interstate commerce in electric energy. It also states that water-power continues to supply about one-third of the total demand for electricity of the country.

* * *

On Dec. 5, the Federal Power Commission opened hearings on the application of the Cumberland River Power Company for a license to develop power at Cumberland Falls in Kentucky. The application is opposed by those who would create a State park, including the Falls.

* * *

It is announced that the Maine Development Commission will, for the information of the next Legislature, undertake a fact-finding survey of the power resources of the State.

* * *

A dispatch from Boise, Idaho, says that a permit for a $650,000 power-development on the Snake and Salmon Rivers has been issued. This calls for construction of a 450-foot dam on the Snake River, a diversion dam on the Salmon River and a 9-mile tunnel to connect the two.

* * *

The Canadian Government has named its group of experts to the Joint International Committee which has been authorized to examine the possible effects on fisheries of the proposed scheme for using the tides of the Bay of Fundy to develop electric power.

* * *

A dispatch from Sacramento says that the California Railroad Commission and the State Division of Engineering have begun an investigation into State supervision of dam structures with the possibility that new legislation may be prepared.

* * *

Engineers of the Central Maine Power Company have started preliminary work on the company's projected development of the hydro-electric resources of the Kennebec River near Bingham. This project is expected to develop about 60,000 H.P.

* * *

The Gatineau Power Company, controlled by the Canadian Hydro-Electric Corporation, a subsidiary of the International Paper Company, has commenced construction of another storage dam on the Gatineau River in the Province of Quebec. This dam will store the waters of Lake Cabonga and will form a reservoir of 45,000,000,000 cubic feet capacity.

* * *

Dispatches from Cedar City, Utah, say that the Dixie Power Company plans the erection in 1929 of an additional hydro-electric power unit on the Virgin River.

* * *

On December 13 Republican leaders of New York State announced that they would cooperate with Governor-elect Roosevelt in some of his proposals, but that this would not include a change in the Republican attitude on state development of water-power.

* * *

Production of Power

The Geological Survey of the Department of the Interior announces that production of electric power by public utility plants in the United States for October aggregated 7,900,899,000 kilowatt-hours, an increase of 14 per cent over the production a year ago.

Rates

The Public Service Electric and Gas Company, a subsidiary of the Public Service Corporation of New Jersey, has announced reductions in electric and gas rates effective Jan. 1, which, it is estimated, will result in savings to consumers of approximately $1,250,000 annually.

* * *

On Dec. 2, the New York Power and Light Company announced a reduction from 5½ to 5 cents per kilowatt-hour in Schenectady.

* * *

Reductions in gas and electric rates for Wakefield, Mass., will go into effect Jan. 1. The new rate for electricity for lighting will be 6 cents.

* * *

The Mohawk Hudson Power Corporation, since March 1, 1928, has had in operation in the Schenectady District of the New York Power and Light Corporation the so-called "counted room rate" for resident's use of electricity. This rate included a 25-cent charge for each room counted, a minimum monthly bill of 75c., a rate of 5½c. per kilowatt-hour for the first ten kilowatt-hours per month per counted room, and 3 cents per kilowatt-hour over that quantity. Operation from March 1 to Nov. 1 shows the rate-schedule has meant a saving to consumers at the rate of $56,000 per annum. A new reduction from 5½ cents to 5 cents for the initial rate has just been announced, and it is estimated that this will mean an additional annual saving to consumers of over $55,000, the total anual saving over the old rate being $111,000.

* * *

The Public Utilities Commission of Washington, D. C., has ordered reduced rates, to become effective Jan. 1. The household lighting rate will be reduced from 5.9 cents to 5.2 cents. The residential heating and cooking rate is reduced from 5.9 cents to 5.2 cents, with a secondary rate of 3 cents for current in excess of 10 kilowatt-hours. Commercial schedules are also reduced. The total annual reduction is estimated at $625,061.99. A feature of the new rate-schedule is a charge of $2.00 for reconnection of service for customers whose meters have been cut off because of non-payment of bills.

* * *

On December 18 Chairman Prendergast of the Public Service Commission of New York State said that the subject of the difference in the types of rates for gas and electricity in New York State is being studied by engineers of the Commission. Mr. Prendergast declared that at present there are six general types of rates employed in the electrical business and mentioned confusion resulting from use of different types in adjoining territory.

* * *

The Alabama Public Service Commission on December 13 conducted a hearing on the petition of the City of Mobile for lower residential lighting rates.

* * *

Regulation

The Massachusetts Department of Public Utilities, in response to direction by the last Legislature to investigate and report on the best methods of regulating and supervising gas and electric utilities, has submitted a report to the incoming Legislature advocating a bill similar to that sponsored by the Department last year. This contains provisions which would cause the utilities to enter into contractual relations with the state concerning rates. A second bill presented would repeal the present Massachusetts statute requiring municipalities to purchase the property of local companies if the municipalities should decide to go into the utility business.

WITH OUR CONTEMPORARIES

Appreciates Effort of Tennessee Public Utility Information Bureau

While this newspaper has always looked with favoring eyes upon the utilities of the state, it is just now beginning to appreciate the full service which they are rendering to the public. For a long time we thought of the power companies as organizations whose sole function it was to generate power to turn the wheels of industry. Now we have awakened to the fact that their service is more far reaching than we have hitherto realized.

The public utilities here in Tennessee have had, and are still having a tremendous part in the industrial development of the state. Without them Tennessee's now brilliant hopes of becoming the new industrial center of America would have remained unborn. The utilities have in a sense pregnated Tennessee with the desire to encourage new industries to locate within her borders.

The *Graphic* appreciates the splendid efforts that the Tennessee Public Utility Information Bureau is exerting in behalf of the state as a whole, and it is proud to have a small part in carrying the utilities' messages to the thinking people of this community.—Halls, Tenn., *Graphic.*

The Real Yardstick in the Utility Business

The Golden Rule is the real yardstick in the Utility Business. The extent to which the consumer is given his money's worth in service and satisfaction, is the measure of our success. If we do that our business is what it should be. If not, then representatives of the company must get a new and better conception of their work.—*The Southwestern.*

Why Our Country Uses Most Electricity

Our country uses almost as much electricity as all the rest of the world put together. Why? Because it has been made almost universally available; because the standards of service are maintained to the general satisfaction of the customers and because the price at which service is sold is easily inside its value.—Atlanta, Ga., *Constitution.*

Canadian Province Rejects P. O.

After a spirited fight between advocates of public and private ownership of hydro-electric developments, the provincial government of Manitoba has leased the water powers of Seven Sisters Falls on the Winnipeg river to a subsidiary of the Winnipeg Electric Company for a term of 50 years, under stipulation that the province may take over the property at the end of 30 years. More than that, the government at Ottawa has confirmed the lease, a procedure that was necessary, for when Manitoba was admitted to provincial status, the Dominion government reserved provisional control over natural resources there. With respect to the provinces of the original confederation there is no such provision.

The leasing of the power of the Seven Sisters Falls, marks somewhat of a departure from policy in Manitoba. It is a great victory for the advocates there of private enterprise. Clearly the people of the prairie province no longer share belief with the people of Ontario that there is virtue only in public ownership and operation of power developments. In this license Manitoba has declared for the policy, commonly accepted in the United States, of private operation under public control a policy the wisdom of which experience has amply demonstrated."—Buffalo, N. Y., *News.*

Not Shocked at N.E.L.A.'s Efforts

We are not particularly shocked at learning that an occasional utility group, especially the National Electric Light Association, has been financing research work in some of the agricultural colleges. A number of the professors, apparently, are on the utility pay roll. Does it mean that the educators and the institutions have been bribed? We guess not. Of course the power groups want to sell electric current to the farmer, but they probably are too clever to waste money in useless propaganda. Unless the use of "juice" for power and light is practical in the country, as it is in town, high pressure salesmanship will not make permanent customers. Electricity is fine on the farm. No doubt about that. But is it just useless expense, or is it a money-saving investment? That's what everybody wants to know—the power companies, experiment stations, and farmers. Any honest attempt to answer that question seems to be worth while, even if the N. E. L. A. provides some part of the funds used by the experimenters in research.—*Farm Life.*

"Damned if They Do and Damned if They Don't"

If the Nebraska Power company and the rest of the electrical industries in Nebraska had not come out in the open and told the public their story they would have been damned by some for keeping information under cover. Now, when they tell the people their story, they are damned for being propagandists.

If the electrical companies had tried to solve the rural electrification problem without cooperation from outside sources, they would have been damned because they had not got all the help possible to speed electricity to the farm. Now, when they appeal for outside help to bring about quicker electrification of the farms of Nebraska, they are damned for trying to spread propaganda in our state university.

It appears to us that they are damned if they do and damned if they don't. This kind of destructive criticism will never build our city and will never build our state. Prosperous cities and progressive states are developed by cooperation, by recognition of merit, and by confidence, and not by destructive criticism, suspicion and harangue.—Chas. E. Hall, in *Omaha's Own Magazine and Trade Review.*

An Ordinary Incident of Modern Business

Time was, not so many years ago, when a merger of utility companies, such as that just reported from Weston and involving plants there, at Glenville St. Albans, Dunbar and Rainello, raised a howl of protest. Now, however, such mergers are accepted as an ordinary incident of modern business.

What is the reason for this radical change of public opinion! There are several. The main one is, perhaps, an awakened appreciation of the fact that in union there is greater efficiency, more economy and enhanced public service. It represents a logical economic improvement. But behind this other factors have operated during the intervening years.

The public utilities learned through experience that it paid better to conduct their concerns with due regard for the needs and welfare of the people than to subserve the wishes and whims and greed of their owners.

Then public regulatory laws and bodies were created to prevent exploitation of such properties for personal benefit.

Also, ownership of these utilities has changed over the years. Formerly they were held by individuals, families or a small group. Now these concerns are largely owned by the people.

Without these factors, there would probably be as much of a howl today against such combinations as formerly. —Clarksburg, W. Va., *Telegram.*

Senator Walsh Pulls a Popgun on Propagandists

(Original title of article)

The Congressional mill has already begun to grind and even before its working parts have started to function smoothly it has yielded something of interest to all advertisers and publishers. This consists of a bill (S. 4707) introduced in the Senate by the senior Senator from Montana—Thomas J. Walsh. It was read the first time by title, the second time at length (ask a parliamentarian to explain what that means) and then referred to the Committee on Post Offices and Post Roads. This is how it reads:

> Be it enacted, etc., That no publication entitled to or claiming second-class postage rates shall print any reading matter for pay or furnished in substance by any person, association, or corporation paying for display advertising in such publication, knowing it was so furnished, unless the fact that it was so provided or paid for shall be plainly indicated in a statement published in connection with such reading matter: Provided, however, That the prohibition hereof shall not extend to matter that is obviously ordinary advertising. Upon finding by the Postmaster General that any publication has violated the provisions of this act all privileges it enjoys to second-class rates shall cease, but after the lapse of six months from and after such finding they may, in the discretion of the Postmaster General be restored.

The story back of this bill is quickly told. Senator Walsh is the author of the original Senate resolution, passed during the last session of Congress, which directed the Federal Trade Commission to investigate the public utilities. Anyone who reads the news knows that the Trade Commission lost no time in setting in motion the wheels of the investigation and what has since been uncovered is either an atrocious plot or a perfectly legitimate educational campaign—it all depends on the glasses through which one views the discovery.

Of course, Senator Walsh's binoculars have been of the kind that radically distort everything the Commission turns up. Two things in particular have roiled the Senator. One is the work which the public utilities have done through the school system. The other is their method of utilizing the advertising and news sections of publications to further their aims.

These things have so annoyed the Senator that he has introduced two bills which, if they are ever passed—and that scarcely seems likely—would most effectively put a quietus on the educational activities of the utilities. By some that might be considered serious enough, but it becomes downright calamitous when one realizes that the second of these two bills—the one aimed at propaganda in publications—would, according to the New York *Sun*, cause most authorities on various subjects either to give up their anonymity or their honorariums.—*Printer's Ink.*

The *New York Sun* in the editorial referred to above concludes thus:

Senator Walsh's bill is fortunately silly enough to kill itself. When it is dead we suggest that he draw one aimed at obnoxious propaganda methods: an act which will prevent, for instance, a Senator from using his franking privilege to send out 300,000 pieces of mail in a primary campaign. The senior Senator from Montana is quite familiar with the evils that attend the frank, for he is the Senator who sent out the 300,000 pieces of mail, at the public's expense, in his effort to capture the Democratic delegates from California to the Houston convention.—*New York Sun.*

REVIEWS OF N. E. L. A. AND RELATED PUBLICATIONS

State Laws Relating to Theft of Electric Current: Serial Report of Meter Committee, N. E. L. A. Pub. No. 289-7, 26 pages. Price, 40c; to members, 25c.

THE Meter Committee of the National Engineering Section has just published a compilation of statutory provisions of the states of the Union and the District of Columbia governing the unlawful diversion or theft of electric current. The statutes were compiled by the general counsel for the Association. The compilation shows that the District of Columbia and every state, with the exception of Oklahoma, have laws of some kind on the subject. Most of the statutes are limited to electric current and gas, but many cover electric current, gas, water and steam. In Oklahoma the statute covers only gas. In other states, steam heating, telegraph and telephone are included.

The New York law, which is very comprehensive, reads as follows:

> Sec. 1431.—A person who willfully, with intent to injure or defraud:
>
> 1. Connects a tube, pipe, wire or other instrument or contrivance with a pipe or wire used for the conducting or supplying illuminating gas, fuel, natural gas or electricity in such a manner as to supply such gas or electricity to any burner, orifice, lamp or motor where the same is or can be burned or used without passing through the meter or instrument provided for registering the quantity consumed, or uses such gas or electricity obtained by reason of the making of such connection; or,
>
> 2. Obstructs, alters, injures or prevents the action of a meter or other instrument used to measure or register the quantity of illuminating fuel, natural gas or electricity consumed in a house or apartment, or at an orifice or burner, lamp or motor, or by a consumer or other person or a person other than a State inspector or deputy inspector of gas meters or an employee of the company owning any gas or electric meter, who willfully shall detach or disconnect such meter, or make or report any test of, or examine for the purpose of testing any such meter so detached, or disconnected; or,
>
> 3. In any manner whatever changes, extends or alters any service or other pipe, wire or attachment of any kind, connecting or through which natural or artificial gas or electricity is furnished from the gas mains or pipes or wires of any person, company or corporation without first procuring from said person, company or corporation written permission to make such change, extension or alterations, or uses gas or electricity obtained by reason of such changes, extensions or alterations without first procuring the written permission aforesaid; or,
>
> 4. Makes any connection or re-connection with the gas mains, service pipes or wires of any person, company or corporation furnishing to consumers natural or artificial gas or electricity; or turns on or off or in any manner interferes with any valve or stopcock or other appliances belonging to such person, company or corporation, and connected with its service or other pipes or wires, or enlarges the orifice of mixers, or uses natural gas for heating purposes except through mixers, or uses electricity or artificial gas for any purpose before it has passed through an instrument for measuring the quantity consumed, without first procuring from such person, company or corporation a written permit to turn on or off such stopcock or valve, or to make such connections or re-connections or to enlarge the orifice of mixers or to use for heating purposes without mixers, or to interfere with the valves, stopcocks, wires or other appliances of such person, company or corporation as the case may be; or,
>
> 5. Retains possession of or refuses to deliver any mixer or mixers, meter or meters, lamp or lamps or other appliances which may be or may have been loaned or rented to them by any person, company or corporation for the purpose of furnishing gas, electricity or power through the same, or who sells, loans or in any manner disposes of the same to any person or persons other than the

said person, company or corporation entitled to the possession of the same; or,

6. Sets on fire any gas escaping from wells, broken or leaking mains, pipes, valves or other appliances used by any person, company or corporation in conveying gas to consumers, or interferes in any manner with the wells, pipes, mains, gate-boxes, valves, stopcocks, wire, cables, conduits, or any other appliances, machinery or property of any person, company or corporation engaged in furnishing gas to consumers unless employed by or acting under the authority and direction of such person, company or corporation; or,

7. Opens or causes to be opened or re-connects or causes to be re-connected any valve lawfully closed or disconnected by a district steam corporation; or,

8. Turns on steam or causes it to be turned on, or to reenter any premises when the same has been lawfully stopped from entering such premises, is guilty of a misdemeanor.

Sec. 1431-a—The existance of any of the conditions with reference to meters, or attachments described in Sec. 1431 of this article is presumptive evidence that the person to whom gas, electricity, water or steam is at the time being furnished by or through such meters or attachments has, with intent to defraud created or caused to be created with reference to such meters or attachments, the condition so existing.

Sec. 1937—A person convicted of a crime declared to be a misdemeanor, for which no other punishment is specially prescribed by this chapter, or by any other statutory provision in force at the time of the conviction and sentence, is punishable by imprisonment in a penitentiary or county jail for not more than one year, or by a fine of not more than $500, of by both.

The courts have held that electric current and illuminating gas may be the subjects of larceny. In the case of Commonwealth v. Caroline Shaw, 86 Mass. (4 Allen) 308m, the court said: "There is nothing in the nature of gas used for illuminating purposes which renders it incapable of being feloniously taken and carried away. It is a valuable article of merchandise bought and sold like other personal property, susceptible of being severed from a mass or larger quantity and of being transported from place to place."

The statute of Vermont was contested on the ground that it makes it a crime to use unlawfully the current from a line owned by a corporation, but it does not make it a crime to so use the current from a line owned by an individual, partnership, or association. In sustaining the statute, the court said that "Speaking broadly, it is the province of the Legislature to decide what acts are sufficiently inimical to the public welfare to be declared to be criminal. In the matter of creating and defining criminal offenses, the Legislature has a very broad discretion, with the exercise of which the courts can interfere only when constitutional limitations plainly have been transgressed. The power of classification for such legislative purposes will be reviewed only when exercised in a palpably, arbitrary manner. It is established by the decisions that a criminal statute enacted for the protection of a particular class is not unconstitutional simply because the specified class is not all-inclusive or might have been so enlarged as to include other equally meriting the same protection." (State v. Shady, 186 Atl. 27; 188 Atl. 777.)

A comparison of the compilation shows a great diversity in the text and the punishment for the violations thereof. Penalties range from fines of $5 to $1,000 and/or imprisonment of one day to ten years. Some statutes provide for the recovery of damages in a civil action by the person or corporation injured. In New Hampshire, in addition to a fine, the person or corporation injured may recover treble damages. What is to be desired is more uniform legislation in the different states. — John D. Van Wagoner.

Practical Uses of Steel and Concrete Poles: Serial Report of Overhead Systems Committee, N. E. L. A. Pub. No. 289-6, 22 pages. Price .40; to Members .25.

This serial report presents some of the general considerations relative to the use of steel and concrete poles, followed by summaries of replies to questionnaires on their use by companies in this country.

The report gives the advantages of steel poles over wood as: longer life, greater strength, lower maintenance cost and smaller depreciation charges. Conversely, the disadvantages are: Higher initial cost, greater hazard for linemen at work, and in the case of fabricated structures, greater ease with which they may be climbed by an unauthorized person.

However, the report points out, there is no hard and fast rule which dictates the use of steel poles over wood poles or any other structure. Each line must be judged on its own merits, and a careful study made of all the factors involved before a choice can be made.

There has been comparatively little use of reinforced concrete line poles by power companies in America, but the subject will undoubtedly be a very live one in the near future, the report says.

Most of the concrete poles now in use were made at the places where they are installed, and because of their great weight could not be moved economically with the equipment available in the past. Answers to questionnaries indicate that past installations have been limited to locations where there was good assurance it would not be necessary to move these poles, and to locations where requirements were for greater strength, improved appearance or longer life. In all cases which have come to the attention of the subcommittee which prepared the report, concrete poles have been used for distribution purposes where one or more of the above considerations were particularly urgent.

It seems probable that there is room for considerable improvement in the methods at present employed in manufacturing concrete poles. The use of waterproofed concrete and of rust-proofed reinforcement may prove decidedly beneficial in increasing the life of reinforced concrete poles. P. W.

Canadian Rum Runners Send Hooch by Electric Cable

NIAGARA FALLS, N. Y., Dec. 13 (A. P.)—Rumors have been current for some time that rum runners have smuggled liquor across the Niagara Gorge from the Canadian to the American side by means of the cables of the power transmission line which spans the gorge from near the Ontario Hydro Commission's plant at Queenstown to a location below Devil's Hole on the American side were given credence. Ontario Provincial police seized an automobile containing liquor, block and tackle lines and pulleys near the hydro plant on the Falls Queenstown Highway on the Canadian side.

The transmission towers on the Canadian side are much higher than on the American side and the cables have a sharp descent toward the American bank of the gorge. This aids the runners in working a basket or other carrier containing the liquor over the cable, the Canadian authorities assert.

With block and tackle and sufficient lines, the Ontario Provincial police say, the runners could work the liquor across.—*New York Evening Post.*

* * * *

Maybe that's how white lightning gets that way.

The Genesis of a Joke

Or How the Scotchman Is Made to Pay and Pay and Pay

The story has come to us that when the door to a hidden closet was recently opened in an Alpine, Mich., home an electric light bulb was found to be burning and as far as the tenants and former tenants were able to recall, that closet had not been opened for sixteen years etc., etc.—January, 1928, N. E. L. A. Bulletin.

* * * *

And now look what's going the rounds.

* * * *

When electrical engineers were asked to give quotations on overhauling the lighting system of a theatre in Aberdeen, Scotland, a certain line was found to disappear in a wall where the trail ended.

Nearby was a locked door, the key to which had been lost. No one from the manager to the call boy could remember that the door had been opened. It was forced. The unknown room had been used by billposters, and according to a poster lying on the floor there the place had not been used since 1906.

A 16-candle-power carbon lamp was burning brightly just as it had evidently been left by the last occupant of the room. *When the manager estimated the cost of the wasted light for 22 years, he fainted.*

CORRESPONDENCE

To the Editor:

In a recent article, the writer made some such statement as this—"—service, (punk word)" and since has had his sensitive ear drums smitten with anguished protests.

So he repeats, "Service—punk word."

Now it didn't use to be, or so I am told. But it is now—in many instances. We need a new word to denote *personal* service. Most present day usage of the word service denotes *dollar* service. We hear about this service and that service, and a thousand and one different "services," and in many instances—most instances—when you try them out, you feel you didn't get a Continental dam's worth more for your money than what you paid for, and sometimes not what you paid for.

If service is merely a commodity, to be bought and sold, perhaps the present use of the word is all right. However, everybody with any old thing to sell, from worn out automobile tires to a patent hickey to keep your last collar button from rolling under the chiffonier when you're in a hurry, yells at you from roadside signs, pennants, newspaper and magazine ads, slogans on letter heads, envelope enclosures, shipping tags, telephone calls, etc., etc., ad infinitum, about their wonderful service, and in only rare instances do you get what, to the writer's way of thinking, is real SERVICE.

Now, delivering a man exactly what he orders, or pays for, from a hot dog with trimmings, to dependable electric service, is service—of a sort. But real SERVICE is delivering him more than he expects to get, with extras thrown in—the slice of pickle on the sandwich without being charged an extra nickel or dime for it—little personal things—courtesy—(genuine courtesy, not the commercial variety)—thoughtful consideration of individualistic needs—the personal relationship with him that makes him feel as though he is being dealt with as a flesh and blood human being, instead of just another one of those things classed as a customer—good, fair or poor, or a prospect, hot or cold.

The heads of most businesses, including the public utility business are imbued with the idea of service as I have outlined it in the preceding paragraph. The sad part of the situation is that so many of the people who must come in contact with the customers or prospects of big business can't or won't get the idea into their heads.

How to pump it into them? It probably can't be pumped in. Some people are so selfishly constituted that they'd never get the idea. But somehow or other the writer feels that if he were the president or general manager of a big business — ANY business — public utility, chain lunch counter or hair tonic dispensary, he'd spend a lot of his time —most of it—in trying to get this idea of *personal* service beyond the *dollar* service over to his employees, and let somebody else do some of the other things he might be tempted to do, instead of making an occasional speech on the subject, or issuing a perfunctorily worded bulletin or command semi-occasionally and then presumably forgetting about it until some particularly grievous complaint brought it to his attention again.

The success or failure of any business or endeavor depends not nearly so much on the excellence of its product, as on what people think about it; and what they think about the employee with whom they must come in contact in buying, using or paying for it has a whole lot more to do with what they think of the product than the product itself.

Do I hear somebody say, "What a fine, idealistic sermon! But old stuff. Sounds well, but in these days of huge corporations it can't be done. If they get *dollar* service, people ought to be satisfied."

Well, maybe so.

C. M. KILIAN.

Atlanta, Ga.

Public Utilities Make Best Showing

(*Continued from page* 54)

centage of companies reporting a net income, the percentage of the total gross income earned by these companies and the average income per corporation. The right hand side shows the percentage of companies reporting no net income, the percentage of the total gross income earned by these companies and the average income per corporation.

This table emphasizes one of the major trends of American industrial progress, namely, the continual concentration of successful business in larger units which, because of the economies effected by mass production, are able to show profits to their investors and at the same time reduce the cost of service to the consumer.

Corporation Returns for 1927, *by Major Groups*

	Reporting a Net Income			Reporting No Net Income		
	Per Cent of Total Number	Per Cent of Total Gross Income	Average Income per Corp'n	Per Cent of Total Number	Per Cent of Total Gross Income	Average Income per Corp'n
Mining and Quarrying..	28	52	$389,500	72	48	$139,350
Agriculture	45	78	138,300	55	22	32,150
Service Organizations ..	54	66	140,500	46	34	86,100
Amusements	50	76	202,000	50	24	59,250
Professional	54	49	67,700	46	51	82,150
Business	58	85	164,700	42	15	38,250
Financial Organizations	57	77	141,100	43	23	55,200
Insurance Companies...	55	86	2,158,000	45	14	429,000
Transportation	57	85	1,174,000	43	15	283,300
Manufacture	58	81	828,600	42	19	261,550
Construction	58	79	230,500	42	21	85,750
Trade	61	84	442,500	39	16	132,600
Public Utilities........	67	95	425,750	33	5	47,100
All Corporations.......	55	81	411,517	45	19	119,652
Same for 1926.........	58	83	457,212	43	17	122,259

The Electric Light and Power Industry During 1928

(*Continued from page* 24)

books at approximately $10,000,000,000, being exceeded only by agriculture, steam railroads and the oil-producing and refining industry. Gross revenues from the sale of current during the year approximated $1,900,000,000, out of which the light and power industry paid $175,000,000 in taxes.

Electric power costs to the public, including industrial, commercial and domestic uses, remain at pre-war levels, despite the fact that living costs are 65 per cent above pre-war levels. Advances in efficiencies of steam turbines and high-pressure boilers have reduced the average consumption of coal from 3.2 lb. per kw-hr. in 1919 to 1.7 lb. in 1928. Lowered cost of electricity generated by fuels brings such power into increasingly sharp competition with water power, which forms but 36 per cent of all power generated by the electric light and power enterprises of this country.

Information from the National Electric Light Association records shows that each year 250,000 customers buy the stocks of the light and power companies. The total number of individual security holders (excluding such indirect ownership as is represented by insurance companies, banks and similar institutions) is estimated to be in excess of 1,500,000.

New Members

(*Continued from page* 3)

Manufacturers (Class D)

Illinois, Chicago, Automatic Burner Corporation.
Illinois, Chicago, Mathias Klein & Sons
Illinois, Chicago, W. H. Salisbury & Company, Inc.
Iowa, Newton, One Minute Manufacturing Company
Maryland, Baltimore, May Oil Burner Corporation
Michigan, Jackson. Reynolds Spring Company
New Jersey, Trenton, Circle F Mfg. Company
New York, New York, Alberene Stone Company
New York, New York, Burndy Engineering Co., Inc.
New York, New York, Serelco, Inc.
New York, Utica, American LaFrance & Foamite Industries, Inc.
Ohio, Gettysburg, Ira M. Petersime & Son
Pennsylvania, Philadelphia, James G. Biddle
Wisconsin, Madison, Hankscraft Company

Employees of Manufacturing Companies (Class E)

Illinois, Chicago, Mathias Klein & Sons
    A. G. Storrs
    Harry B. Wilson (Wilmette, Ill.)
    Harry H. Wotherspoon (Methuen (Lawrence P. O.) Mass.)
Illinois, Chicago, Reynolds Spring Company
    Charles F. Goodrich (Jackson, Mich.)
    John G. Rossiter (Jackson, Mich.)
Iowa, Newton, One Minute Manufacturing Company
    John M. Culver
    W. Scott Long
Maryland, Baltimore, May Oil Burner Corporation
    A. Klotzman
Massachusetts, Worcester, American Steel & Wire Company
    Dwight Eldredge Brown (New Haven, Conn.)
    Harry E. Stoy (Atlanta, Ga.)
Michigan, Detroit, Ironrite Ironer Company
    J. D. Paladeaux (Los Angeles, Cal.)
New York, New York, Graybar Electric Company
    Arthur R. Fryklund (San Francisco, Cal.)
New York, New York, Johns Manville Corporation
    Alexander C. Kidd
New York, New York, Safety Cable Company
    Edward B. Hook, Jr. (Atlanta, Ga.)
New York, Rome, Rome Wire Company
    Frank T. Bolster
New York, Utica, American LaFrance & Foamite Industries, Inc.
    C. S. Johann (New York City, N. Y.)
    W. M. Laughton
Pennsylvania, East Pittsburgh, Westinghouse Electric & Mfg. Co.
    P. M. Kendall (Boston, Mass.)

Associated Companies (Class F)

Alabama, Birmingham, J. H. Taylor, Commissioner of Public Safety
California, Los Angeles, Thor Pacific Company
Illinois, Chicago, Industrial Power
Minnesota, Minneapolis, Northwest General Electric Supply Company
New York, New York, Trojan Engineering Corporation.
Texas, San Antonio, M. L. Diver, Consulting Engineer

Employees of Associate Companies (Class G)

California, Los Angeles, Thor Pacific Company
    E. O. Thomas
California, San Francisco, Baker-Joslyn Com-
    J. E. Barhydt
California, San Francisco, Maydwell & Hartzell, Inc.
    E. S. Condon (Los Angeles, Cal.)
Connecticut, Stamford, The F. A. Bartlett Tree Expert Company
    George M. Codding
    Albert W. Dodge, Jr. (Boston, Mass.)
    Robert H. Sands (Boston, Mass.)
    Howard E. West
New York, New York, Bowser Service Corporation
    Miss Marie L. Bown (Wollaston, Mass.)
New York, New York, R. W. Cramer & Company, Inc.
    N. F. Harrington
New York, New York, Trojan Engineering Corporation
    William N. Ryerson

Foreign Members (Class H)

Republic of Argentine, Buenos Aires, Compania Anglo-Argentina de Electricidad
Manchuria, Dairen, S. Haraguchi

Employees of Foreign Members (Class I)

Republic of Argentine, Buenos Aires, Compania Anglo-Argentine de Electricidad
    Angel Di Benedetto
    Mauro Herlitzka
    Arnaldo Maione
India, The Tata Hydro-Electric Power Supply Company, Ltd.
    N. J. Cursetjee (Bombay, Bombay Presidency)

Extracts from the Constitution of the National Electric Light Association

ARTICLE II—OBJECT

The object of this Association shall be to advance the art and science of the production, distribution and use of electrical energy for light, heat and power for public service.

In the furtherance of this object its activities shall be largely educational and for the fullest development of the electrical engineering arts and sciences in all their branches.

It shall not be engaged in business.

ARTICLE III—MEMBERSHIP

SECTION 1. *Members shall be divided into ten classes — Central Station Company Members (Class A), Central Station Individual Members (Class B), Invited Members (Class C), Manufacturer Company Members (Class D), Manufacturer Individual Members (Class E), Associate Company Members (Class F), Associate Individual Members (Class G), Foreign Company Members (Class H), Foreign Individual Members (Class I), and Honorary Members.*

SECTION 2. *Class A members shall be regularly incorporated public service companies engaged in producing and supplying electrical energy for light, heat or power for public use. They shall be entitled, through their regularly accredited delegates, to attend all meetings of the Association, to vote and to hold any office.*

SECTION 3. *Class B members shall be officers or employees of Class A members, elected or continued from year to year with the written approval of the Class A members with which they are connected. They shall have the same privileges as Class A members, except the right to vote at the executive sessions of the Association.*

SECTION 5. *Class D members shall be companies or firms engaged in the manufacture of apparatus, machinery, equipment, supplies or material for the production or use of electrical energy. They shall be entitled, through their regularly accredited delegates, to attend all meetings of the Association, to vote and to hold offices not restricted by provisions of this Constitution to other classes (see Article V—Officers).*

SECTION 6. *Class E members shall be officers*

To *Members* and NON-MEMBERS

IN 1923 Class B members (officers and employees of Class A members —electric light and power companies) numbered 9096 (membership in all classes totaled 12,529).

Without a membership campaign or the application of any pressure of whatever nature to gain new members, Class B membership now stands at 15,368 (membership of all classes totals 20,847).

Campaigns for Class B members have been proposed and discussed on a number of occasions, but the invariable conclusion has been that some members gained through the emotional stimulation of a high pressure membership campaign might not be the type desired by the association.

It is felt that those men and women who voluntarily become associated with the National Electric Light Association do so with the realization that membership is, in itself, and aside from

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NATIONAL ELECTRIC LIGHT ASSOCIATION

420 LEXINGTON AVENUE, NEW YORK, N. Y.

CLASS "B" MEMBERSHIP APPLICATION

Class "B" Membership Qualifications and Dues on other side

Date ______________________ 192___

I hereby apply to the National Electric Light Association for Class "B" membership, and, if elected, agree to comply with its Constitution and By-Laws.

(Use typewriter—otherwise print)

Name ______________________________________

Company ______________________________________

Department ____________________ Position ____________________

Company Address—Street ______________________________________

City ____________________ State ____________________

(If mail should be sent to other than "Company Address" indicate below)

Mailing Address—Street ______________________________________

City ____________________ State ____________________

(Application must be approved below by an official of the applicant's company)

Approved by ______________________________________

(Approving Official please sign here)

Official Position ______________________________________

This is a fac-simile of the Class B application blank. It may be used if desired. Application blanks for any class of membership will be mailed upon application to the Secretary, National Electric Light Association, 420 Lexington Ave., New York, N. Y.

10,000 3-26

any immediate and tangible value, a token of the interest they take in their profession.

To judge from numerous inquiries that have reached headquarters and from other evidence, there are many eligible men and women, of the type who can profit most from membership, who are unacquainted with the conditions under which they may join the Association.

To these men and women, these pages, carrying the necessary information, are addressed. For their convenience and immediate use a detached application form is made available on these pages. Additional class B application blanks, or blanks for any other class of membership will be mailed upon request to the Secretary, National Electric Light Association, 420 Lexington Avenue, New York, N. Y.

It is also hoped that any member who feels so disposed will pass this copy of the N. E. L. A. BULLETIN to some coworker who may be interested.

EXTRACTS FROM CONSTITUTION

ARTICLE III—CLASS "B" MEMBERSHIP

Section 3. Class B members shall be officers or employees of Class A members, elected or continued from year to year with the written approval of the Class A members with which they are connected. They shall have the same privileges as Class A members, except the right to vote at the executive sessions of the Association.

Section 12. Individual members (Class B, Class C, Class E, Class G and Class I) may purchase, at member price, proceedings, handbooks, and other literature that may be published by the National Electric Light Association for general distribution.

ARTICLE IV—CLASS "B" DUES

Section 2. The annual dues of Central Station Individual Members (Class B) shall be Three Dollars ($3.00).

Section 11. In the event that an applicant for Class B, Class E and Class G membership is elected after July 1st, the dues for the remainder of the year shall be Two Dollars ($2.00), which will entitle the member to the *National Electric Light Association Bulletin* for the same period.

Section 15. All dues shall be payable in advance and shall cover the period of the calendar year. Any member in arrears for sixty (60) days shall be suspended from all privileges of membership, but may be reinstated when all outstanding dues have been paid.

Section 16. All dues of individual members (Class A, Class B, Class C, Class D, Class E, Class F, Class G, Class H, Class I), include subscription to the *National Electric Light Association Bulletin.*

or employees of Class D members, elected or continued from year to year with the written approval of the Class D members with which they are connected. They shall have the same privileges as Class D members, except the right to vote at the executive sessions of the Association.

SECTION 8. *Class G members shall be officers or employees of Class F members, elected or continued from year to year with the written approval of the Class F members with which they are connected. They shall have the same privileges as Class F members.*

SECTION 9. *Class H members shall be individuals or corporations not residents of the United States or of Canada, engaged in the central station industry, or interested in advancing the use of electrical energy, who shall ally themselves with this Association. They shall have the same privileges as Class A and Class D members, except the right to hold elective office or to vote at executive sessions.*

SECTION 10. *Class I members shall be officers or employees of Class H members, elected or continued from year to year with the written approval of the Class H members with which they are connected. They shall have the same privileges as Class H members.*

SECTION 12. *Individual members (Class B, Class C, Class E, Class G and Class I) may purchase, at member price, proceedings, handbooks, and other literature that may be published by the National Electric Light Association for general distribution.*

ARTICLE IV—DUES

SECTION 2. *The annual dues of Central Station Individual Members (Class B) shall be Three Dollars ($3).*

SECTION 5. *The annual dues of Manufacturer Individual Members (Class E) shall be Three Dollars ($3).*

SECTION 7. *The annual dues of Associate Individual Members (Class G) shall be Three Dollars ($3).*

SECTION 9. *The annual dues of Foreign Individual Members (Class I) shall be Five Dollars ($5).*

SECTION 16. *All dues of individual members (Class A, Class B, Class C, Class D, Class E, Class F, Class G, Class H, Class I), include subscription to the* NATIONAL ELECTRIC LIGHT ASSOCIATION BULLETIN.

Eye Openers from this Issue
THE SPOTLIGHT
So that he who runs may read

THERE are so many developments for the use of electricity for the benefit of mankind (and they have come so rapidly and each is so interesting, even fascinating) that we have jumped from one development to another, and all but the latest have been neglected.

It is time that we organized departments of high-grade men to specialize each in its branch of exploitation work. Then we will get the real development which each of these wonderful human helpmates is entitled to.

JOHN F. GILCHRIST, *in "Central Stations Think They Are Interested in Electrical Advertising."*

Many farmers who today are prosperous because of electrification combined with scientific methods of farming were as good as bankrupt a few years ago.

Amplifier Looks at Agriculture.

HE seems always to be in an enthusiastic glow about something—science, truth, education, the cosmos, turtle husbandry, some experiment of promise. So marked is the simplicity of his manner, and so hearty and informal his greeting, that it is difficult for the casual visitor to realize that this is a world-renowned scientist, the recipient of many degrees and medals, a man whose words are respected in the gatherings of grave and distinguished men.

MAURICE HOLLAND, *in "Willis R. Whitney — Moulder of Genius."*

NEVER has another industry been able to look back upon a scene of accomplishment equal to the contribution of the electrical industry to the people of their country. No other industry or group of people connected with it has ever been privileged to turn about and look forward with such hope and such confidence to the enormous contributions which still lie in their hands for further development.

PAUL S. CLAPP, *in "The Electrical Industry and National Progress."*

IF the personality of the employee is so important, then upon what is this personality based? What causes one employee to make a good impression upon the customer and another to make a poor impression? What governs the conduct of the employee as he stands face to face with the customer? If so much depends on this conduct, is it possible to, in any way, control or standardize that conduct?

The questions are answered by C. E. MICHEL, *in "Service Suggestions."*

THE method of treatment of one of our greatest natural resources, the shade tree, by the utility is proof to us, who may be a trifle emphatic in our desire to perpetuate shade tree growth, that there are yet great material organizations which are not inclined toward the fallacious opinions rampant today that progress is a thing to be measured in material gain.

C. G. CODDING, *in "The Philanthropy of Tree Clearance Programs."*

It has been said that the State Committees and the State Information Bureaus have been furnishing material to the newspapers and concealing its source. This is not an indictment of the public utilities—it is an almost comical indictment of the average newspaper editor—either that or downright libel, when sinister "influence" is implied. Every publicity man and every newspaper man knows the utter futility of sending any kind of a statement to a newspaper without giving its source. The person who does so with the hope of getting the statement printed is unsophisticated to a high degree. The editor who would print such a statement, without having some one to "hang it on," would soon find himself operating an elevator or cleaning up the city room after the staff had finished its work and gone home.

BERNARD MULLANEY, *in "Public Utility Information Bureaus and Why."*

COOPERATION between the National Electric Light Association and the Bell Telephone System has brought about a mutually acceptable code of principles that stands as a basis upon which adjustments of problems arising through inductive interference can be effected. A few practices have already been agreed upon. These practices, however, do not contain quantitative values which are important to their direct application in the field. Our problem now is to expand these practices to cover all our needs, and to do this we must know the extreme limits to which coordination measures can be carried out in both systems.

H. L. WILLS, *in "Development and Research in Inductive Coordination."*

What profit it to scientific men, physically and mentally, to develop and enrich civilization if they remain passive toward the higher arts and the humanities?

W. H. ONKEN, *in "The Louvain Memorial and What It Suggests."*

DOESN'T this steady increase in manufacturing, business, amusements, and general activities of all kinds represent nothing more or less than a steady demand for an increase, or, rather, an improvement, in standards of living? If the answer to these questions is "yes," then the increase in demand for electricity represents not only a statistical prosperity, but a psychological prosperity which, after all, may be the only real prosperity.

Electric News Items Section.

IN this plant will be found the hopes and aspirations of thousands of men who have spent their days in laboratories and in research to the end that the giant electricity, which has slumbered in the bosom of the universe for so many ages, be tamed and harnessed to serve mankind.

A. W. ROBERTSON, *in "On the Occasion of a Ground Breaking."*

***"In the busy days of a great business a matter which is not forcing itself upon you is put aside for other matters."*—JOHN F. GILCHRIST.**

THE PRESIDENT'S PAGE

Why We Advertise

ONE cigarette company is said to be spending eighteen million dollars a year for advertising. Do you suppose it is doing it to control the editorial or news policies of the papers? No. It is doing it to increase consumption of the cigarette, which will reduce the cost of the cigarette. The consumer will get every bit of the advantages, and more, too, of every dollar spent.

We are a business institution. We are competitors with other producers of power. There is still a great deal of missionary work to be done in making even the domestic use of electricity universal. Our problems and motives are the same as those of other advertisers. We desire to sell more electricity, and advertising is one way to help do it. The electric light and power companies manufacture a commodity, which, in recent years at least, is on a mass production basis, with all that that connotes. Advertising by central stations, by manufacturers of electrical apparatus, by the financial houses that handle our securities, and, yes, by our customers, has helped to place it there.

We have no right to throw our money away or waste it. We are justified in spending our money only for business reasons, within our own judgment, of course. For every dollar spent on advertising our customers get manifold returns, for it helps us to increase the consumption of electricity and thereby reduces the cost of production and distribution, which in turn is reflected by lower rates. If it did not do that it would not be justified. That is the basis on which we, and everybody else, advertise.

P S Arkwright
President.

NATIONAL ELECTRIC LIGHT ASSOCIATION

A Voluntary Organization of Companies Engaged In, and Individuals Affiliated With, or Interested In, the Electric Light and Power Industry: "Organized to Advance the Art and Science of the Production, Distribution and Use of Electrical Energy for Light, Heat and Power for Public Service"

N·E·L·A·
BULLETIN

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Code address of the National Electric Light Association is "Nelap," Bentley's code.

Facts on Government Ownership

Of more than passing interest to the electrical industry is the new edition, 1928, of "Government (Political) Ownership and Operation and the Electric Light and Power Industry," which has just been made available at the headquarters of the N. E. L. A. The book represents the compilation of a vast number of authentic facts and figures on the municipal and government operation of public utilities. It is written for every one concerned with the industry and its relations to the country and the people whom it serves.

The more than five hundred pages are devoted to reviewing the relation of government to business and the origins and developments of the electrical industry. A large number of quotations from prominent industrial leaders and government officials are given and the last chapters are devoted to chronicling the large number of municipally operated power companies that have turned to private operation. The book is a record, in a measure, of the accomplishments of the privately operated electric light and power companies of the country and it deals in an authoritative and conclusive manner with a problem that not only confronts the industry in some parts of the country, but is also a vital issue in government.

The Field for Electric Water Heating

At a recent meeting of the Merchandising Bureau of the Commercial National Section, Norman T. Wilcox, chairman of the Electric Water Heating Committee, estimated that an annual gross revenue of over $100,000,000 of electric water heating awaits development.

The committee has set as a serious objective the stimulation of active interest in water heating, by pointing out and demonstrating the investment limitations and possible revenues incident to an understanding development of the water heating load. It is the intention of the committee, through tests already made and others that are to be made, to demonstrate the peculiar advantages as well as limitations of the water heating systems already developed, and the benefits to be derived by a well-applied control, such control to be consistent with the utmost of customer satisfaction, and not hedged about with annoying limitations.

Much of the information now at hand, because of the lack of definite data as to time of use and quantities affected is not satisfactory for the determination of diversity of this type of load. Since the diversity has a decided bearing on the total investment required, for a given connected load, it is of prime importance in determining the legitimate rate for this type of service. The committee is therefore now undertaking a comprehensive survey of the field.

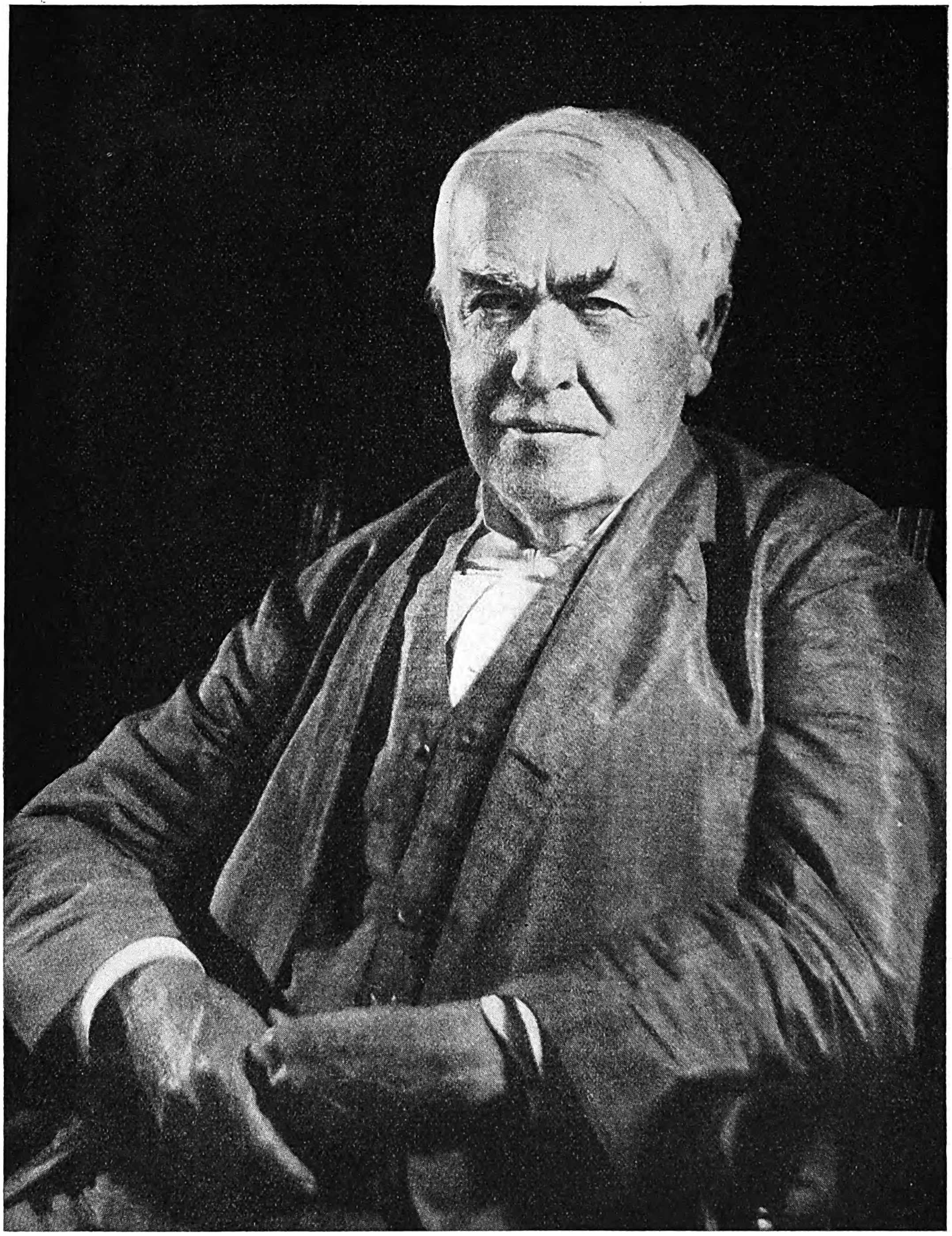
The success of this survey will depend upon the cooperation received from member companies as it is contemplated that all tests will be made under their direct supervision. The data which will be of utmost value to the committee may be obtained directly from printometric records and should preferably consist of a number of simultaneous records for a group of similar heaters. The burden placed on the individual company will not be great, but the results of the combined efforts of the individuals will furnish the committee with invaluable data and it is therefore urged that the member companies heartily cooperate with the committee in the tests and field work.

Twice as Strong

"What is the major influence in forming the customer's opinion of us?" Almost anybody can give the answer. One group of companies after an extensive investigation, based upon scientific method, confirmed what has been accepted as an axiom of the utility business. It was found after analysis that the impression left by personal contact with employees was twice as strong as all other factors combined in determining the customer's estimate of the utility's service.

This month's Service Suggestions tells how one company working upon this premise instituted a course of employee training which was met with enthusiasm by employees and resulted, according to the author of the article, in "Improvement in dozens of indivi-

(Continued on page 124)



FEBRUARY 11, 1847

The most practical of Dreamers of Great Dreams, a man supremely honored in his own time, the National Electric Light Association affectionately salutes MR. EDISON on his eighty-second birthday and, in this Golden Jubilee year of the incandescent lamp, wishes him many more happy years of usefulness.

N·E·L·A·
BULLETIN

February, 1929 Vol. XVI No. 2

The Electrical Industry and National Progress

By Paul S. Clapp

THE rapid stride forward which this country has made since the war is without parallel in all history. No nation in a corresponding period of time has made such rapid advances in their general standard of living and well-being.

We have made remarkable gains in enlarged productivity, in more effective utilization of materials and natural resources, in wiser expenditure of effort, in better organization and management, in acceleration of conduct of business, in expanded world relations, in education, in better methods and processes, in better homes, in scientific invention and discovery, and in quicker translation of their findings into every day use. There has been wider diffusion of wealth and more general participation in the good things of life.

All of the people of the country have contributed to and share in this accomplishment. Likewise all business and all industries have contributed to it. It has been a great national effort, in which the electrical industry has played a leading part.

The Country's Electrical Development

Electrical development in the nation far outstrips population growth. Since 1912 the population of the country has increased 25 per cent; generation of electricity has increased 615 per cent; the number of people living in electrically wired homes has increased 470 per cent; and the number of customers receiving service has increased 510 per cent. Consumption of electricity has increased twenty times faster than population.

Mr. Clapp—Managing Director of the National Electric Light Association

The people of this country use as much electrical energy as all the rest of the world combined. The generating capacity operated is four and a half times greater than the generating capacity in any other nation.

In 1882, when Pearl Street Station was opened in New York City, heralding the birth of the electric light and power industry, the lamps which it was to light were carried across the Hudson from Mr. Edison's laboratory in a single bushel basket. Today, to meet the needs of lighting alone, there must be manufactured 1,000,000 lamps in a single day. A bushel basket of today's lamps will give five times as much light as the original basketful, and at about one-third of the cost.

Interconnected Systems the Source of Power

With the rapid development since the war in high voltage transmission, and improvements in power generation a fundamental change in the character of the nation's essential power supply has occurred. It is based upon the development of the interconnected electrical system, and shares the general business trend toward large scale operation with attendant economies. Interconnection, the fundamental change, is, briefly, mass production and distribution of electric power. Interconnected electrical systems provide a source of power supply at once reliable and adequate, available over wide areas, day and night, flexible, and at low cost.

Nation's Power Increases Are Electrical

The nation's power equipment, if we except steam railroads, automobiles and draft animals, consists essentially of that installed in factories, mines and quarries, and in public utility powerhouses. The total installed in these three groups is now 60,000,000 h.p. This may be looked upon as the main power supply directly engaged in manufacture and the productive processes.

A critical and significant turning point has been reached in the nature of new additions to the nation's power equipment, as represented by these groups, and is emphasized by the fact that local installation of boilers and engines in factories, mines and quarries, has come to a standstill. Since 1919, 14,500,000 h.p. or nearly 32 per cent has been added. This stupendous increase in the power equipment of the nation has been in the power-house of the electrical industry. It marks the definite trend toward electrification.

Electric Power and the Worker

Each American worker in 1900 was directing 2.11 hp. In 1925, the average available to each worker had doubled by increase to 4.27 hp. The American worker directs more power than the worker of any other country. Enlarged use of power has contributed largely to increased output per worker, which, in turn, has given to the American worker the largest real wage he has ever enjoyed. It has decreased his hours of labor, it has given dignity to labor, it has reduced industrial fatigue and accidents, it has improved the conditions under which he works, and it has enabled the American worker to participate in a general advance in well-being never before equalled. According to the Department of Commerce* between 1919 and 1925, the output of factories on a quantitative basis increased 28½ per cent; the number of workers was less by 8 per cent; thus showing a gain in output per worker of 40 per cent. The average earnings per worker in 1925 were twice as much as in 1914. His present wages, adjusted for buying power of money, on a 1914 basis, gives him a 35 per cent increase in real wages.

Many factors have contributed to this: education and research, increased use of capital, mass production, elimination of waste, favorable attitude of workers toward machinery. Electricity had a large part. Between 1919 and 1925, six and one-half million hp. was added to factory power equipment. This total increase was in electric motors. There was no increase in local installations of boilers and engines in factories. The volume of power supplied to industry by the utility companies is six times pre-war. Factories are electrifying. Electrification varies in different industries. In some it has already reached nearly 100 per cent. Taking factories as a whole in this country, they are 75 per cent electrified, with two-thirds of the energy supplied from interconnected systems. This degree of factory electrification is greater than that of any other country; Germany has 66 per cent; England, 48 per cent.

Economic Effects of Factory Electrification

This factory electrification has far-reaching effects upon the entire economic structure of the country. I shall discuss certain of these effects.

Release of Capital for Factory Expansion

The installation of electric motors by factory operators and the purchase by them of electric power from the interconnected electrical systems releases to the operators enormous sums of money which would otherwise be needed for investment in boiler and engine equipment. A careful estimate shows that the amount so released in the last seven years amounts to at least one-half billion dollars. This money has been made available to factory operators for investment in other phases of their business where it can often turn over as much as four times in a year. It has greatly accelerated and facilitated factory expansion. The investment in prime movers, on the other hand, has become a part of the investment of the electric light and power industry where it does not turn over more rapidly than once in five years. Large increases in the plant investment of the utilities have been necessitated.

Fuller Coal Utilization

The electrification of factories also has a very important bearing upon the quantity of coal consumed to produce power for factory production. The average factory plant will burn from 3 to 7 pounds of coal for the generation of the equivalent of a kilowatt-hour of energy. The central station plant will burn 2 pounds of coal, or less, to generate the same energy. It is a matter of vital difference where the coal is consumed. The burning of coal in the central station plants of the utilities, instead of in the isolated factory boilers, has resulted in the savings of millions of tons of coal. The estimate of this saving in the single year 1927 is 40,000,000 tons, or more than one-fifth of the total tonnage used by factories.

Fuel Transportation Simplified

This shift in the burning point of coal also has an effect upon transportation, for not only has there been a decrease in quantity of coal required in factory operation, but the transportation of coal has been greatly simplified. Instead of moving to a large number of factories scattered over wide areas, coal now travels more directly in large quantities from the mine to the central station plant. This represents an enormous release of transportation facilities.

Better Factory Location Possible

The provision of these electrical power supplies, adequate and reliable as they are, over wide areas, is also having an important effect upon the economic location of factories. The factory operator looking about for a place to locate is now relieved from going to a power source with his factory. He is free to consider other factors, such as transportation, markets, raw materials, and labor, etc., which enter into factory location. He is able to get a more economical and sounder business location of his factory. The utilities have been active forces in their communities in attracting industries and facilitating expansion.

Diffusion of industry has been made possible, and is rapidly progressing, with benefits both to industry and agriculture. Factories operated in the midst of agricultural areas benefit the farmers. The wealth created lowers tax burdens; increases money available for public improvements and education: perishable farm products become marketable; stability is improved.

Advances in Art of Power Production and Delivery

The electrical industry has made outstanding contributions to the art of power production and power delivery which are shared by all. To the electrical industry are due the major advances since 1890—the reciprocating engine pushed to highest limits of performance; the steam turbine, concurrently with the high speed electric generator, steadily increasing in size and improving in performance; higher pressure, larger boilers, and better fuel utilization; the mercury boiler and turbine; advances in water wheels and hydroelectric development; electric transmission freeing the prime mover from need of mechanical connection to the machines its actuates.

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*Commerce Year Book, 1928.

Effective Utilization of Natural Resources

The use made by the electric industry of the natural resources—fuel and water—intrusted to it is a record of effective, efficient, and economic utilization of these resources.

Fuel—Coal, Gas, Oil

Concurrently with the increase in size of public utility power houses and power house units, there have been decided improvements in fuel utilization. From 1919 to 1927, the amount of energy generated from fuels increased 107 per cent; the quantity of coal and its equivalent used increased only 19 per cent. In ten years the average amount of coal burned to produce a kilowatt hour has been pushed down from 3.2 lb. to 1.7 lb. In nine years, 1919 to 1927, the electrical industry generated 324.6 billion killowatt-hours of electricity from fuels. If the industry had made no improvements and had stayed at 1919 fuel efficiencies, the equivalent of 519.4 million tons of coal would have been required. This amount was decidedly reduced—376.5 million tons were actually burned. Improvements in fuel utilization resulted in equivalent saving of 142.8 million tons —an amount equal to one-fourth of the nation's entire coal production in 1928.

Water Power

There are developed and at work in the country 12,300,000 hp. in hydroelectric plants. Of this amount, 10,600,000 hp., or 85 per cent, is operated by the electrical industry; 5,000,000 hp. of which has been developed since the passage of the Federal Water Power Act in 1920. This total new development has been in the electrical industry.

Water power is no longer developed by the factory operator. There is an actual decrease in factory operated water power.

Development and utilization of water power is real conservation. These developments, as they have gone on, embodied the most advanced designs in hydroelectric machinery. This country has contributed more than any other country to the advancement of the art of hydroelectric development.

Through interconnection of hydroelectric plants and their interspersion with steam plants, the difference in time of seasonal flows of different drainage areas has been taken advantage of and more hydroelectric energy has been obtained from the group than would have been possible if they had been operated singly. It may be said, almost literally, that not a drop of water goes to waste.

Federal Water Power Act

We hear a great deal about grabbing water power. Those who talk about grabbing water power show lack of knowledge of the Federal Water Power Act and of the Federal Power Commission, and of the safeguards therein provided for the public. Every hydroelectric development on navigable streams and within Federal jurisdiction is passed upon by the Commission as to the character of construction, as to capital charge which will be allowed, and as to the rates of return upon the money therein invested. It must not be forgotten that under the provisions of the Federal Water Power Act title to these water power cites is conserved to the public. There can be no exploitation—there is no exploitation; there is only sound development for public service.

Changed Situation as to Water Power

We must revamp many of the viewpoints with regard to water power which have long existed.

Last year, only 39 per cent—and it was a very high year—of the energy requirements of the country came from water. Our principal dependence is on steam, and the advancement in the art of steam generation is so rapid that there is already keenest competition between steam and hydro power.

Efficiencies of hydroelectric machinery have reached a high state of performance—well over 95 per cent. In spite of the remarkable improvements in steam generation, the best over-all efficiencies are about 30 per cent, which indicates the enormous field of future possibility where research and engineering can work for further advancement.

Many of the large undeveloped water powers are far removed from market. Seventy-five per cent of the potential water powers of the United States lie west of the Mississippi, whereas 79 per cent of the power load of the nation lies east of the Mississippi. These are all contributing factors toward a retardation in the rate of water-power development.

Without going into the technical and financial problems involved in hydroelectric development, it can be pointed out that the cost of the power at the switchboard is not the full story. It constitutes probably less than 20 per cent of the cost of the power as delivered to the domestic customer's premises. Costs of transmission, distribution, and of rendering the service make up the large proportion of the cost, as is the case with most commodities. We do not compare the cost of beef on the hoof in Kansas with a steak at a New York hotel.

Local Character of the Industry—Interstate Power

With the growth of interconnection and the construction of high-voltage electric transmission lines, there has also been created a misconception as to the quantity of electric power involved in interstate transmission. Studies by Harvard University for 1927 show that of all the electrical energy generated, less than 10 per cent—actually, 9.6 per cent—at any time crosses state lines. More than 90 per cent of the total is locally generated and locally consumed.

The foregoing gives an all-over picture. It tends to exaggerate the size of the interstate power movement. An analysis of the 9 per cent sector of power which is in interstate movement shows that half of the total amount occurs in nine specific major transfers of energy, such as the Keokuk Dam, Cahokia Steam Plant, Conowingo Plant, etc. With these major transfers of energy across state lines eliminated, the total amounts in interstate movement in the entire country represent only about 4½ per cent of all energy generated. This gives a clearer concept of the factual situation with regard to energy transfers across state lines.

The number of transmission lines crossing state borders, of which there are about 500, is not an adequate test of the interstate implications of electric power. These crossings, in a large proportion, come about in the ordinary process of borrowing and returning power. Maps of interconnected electrical systems look somewhat like railroad maps. Perhaps from this arise erroneous conclusions that these two utilities are similar in their interstate implications. This is not the case. They are totally different in this regard. Whereas from 70 per cent to 80 per cent of all goods loaded in cars by steam railroads is transported across several states, less than 10 per cent of the electric power generated ever crosses a state line.

The Nation's Electrical Bill

The electrical bill of the nation is 1.8 billion dollars annually. This is for all electricity suppied to 19,000,000 homes; for the power turning out over one-half the nation's factory output; for much of the power in electrical transportation; for farm electricity, and for all other uses. Light alone is perhaps worth this whole amount to the people, in increased comfort, safety on streets, saving of eyesight, better working conditions, better space utilization, acceleration and facility of business, and larger productivity. The bill is small compared with other national expenditures. We spend more than this for cosmetics and confectionery.

Power is a relatively small item of cost in manufactured goods. Omitting items essentially based on power, such as electric-chemicals, power is less than 2 per cent of the cost of goods ready for delivery at the factory. The power in the same goods as paid for by the consumer is less than 1 per cent. Taxes alone are more than this.

Electricity takes barely 1 per cent of the average housewife's expenditures. It is the cheapest essential in the "cost of living," and the smallest item in the housewife's expenditure. It costs her 18 per cent less than before the war, while everything else—her rent, food, clothes—have found new higher levels.

Electricity for All the People

An outstanding characteristic of this wonderful electrical development we are having is the fact that it is becoming universal; the service is not for a few alone, it is becoming available to all the people. A democracy, after all, does not consist in charters and bills of rights. A democracy is built upon equal opportunity and common sharing in the benefits of the telephone and the radio, of schools and other blessings. So that the universal use of electricity by rich and poor, high and low, in big town and small town alike, is a great contributing factor to this fundamental of democracy.

The Spread to the Small Town

The high voltage transmission spreads from town to town, reaching out like a pioneer. In five years, the electrical industry has extended electric service to 4,000 towns and villages which before had no service. Not only has there been extended to them electric service, but there has been extended to them 24-hour reliable service of the same quality that the city dweller has. Every city of 5,000 population and more has electric service; 97 per cent of communities between 1,000 and 5,000; 50 per cent of communities with between 250 and 1,000; and 25 per cent of all hamlets with less than 250 population. Such is the universal character of the service.

Contributions to American Home Life

In just seven years the industry has connected up to receive for the first time the benefits of electricity, 9,000,000 American homes, representing the hearthstones of some 40,000,000 American boys and girls, men and women. Some 19,000,000 homes are now served.

Last year, there were added one and a quarter million homes and certainly to these people for the first time came electric light, and there has been opened to them the whole gamut of household appliances which will mean increased comfort in the home and decreased toil.

Electrification of Farms

The electrical industry is aggressively at work in extension of its service to farms. It covets the benefits of electricity for the farm home—and none would benefit more—and for the farmer in his work. Intensive experimentation and research on groups of electrified farms are under way in 24 states. A national research project for rural electrification was established in Maryland last year. The same zeal which successfully accomplished electrification of manufacturing industries, such as steel, paper, etc., is being focused toward farm electrification.

Farms conected with electric power lines have increased 125,000 in three years. Some 350,000 farms now receive central station electric service. Although this is a small proportion of the total number of farms in the country, it clearly indicates the rapid progress being made, and gives assurance of future accomplishments.

Railroad Electrification

The growth in population of the country has enormously increased congestion at the terminals of our great railroads, both passenger and freight. Electricity has commenced to aid in the solution of this problem of congestion. It has facilitated wonderful developments, such as the Grand Central and Pennsylvania Terminals in New York City, and such as the Illinois Central in Chicago. It has enhanced property values. It has opened up whole areas in those cities to an enriched use. Much attention is now being given to main line electrification. In no country does transportation equal that provided by our railroads. Our railroads will make that use of electricity consonant with soundest development.

I have endeavored to interpret some of the contributions the electrical industry is making toward business stability, progress, and security and enrichment of home life. It is upon this foundation that, as a people, we will build toward attainment of the rich moral and spiritual values which we now enjoy to such large degree and to which we aspire in increasing measure.

The Future Challenges

So far, I have indicated what has been done. We have just commenced. Enormous fields of opportunity lie ahead of us. Less than two-thirds of the population live in homes using electricity. We should not be satisfied until we have extended this service to all of the people. Less than one-half of the homes now wired use anything beyond lights and a flat-iron. We should not be satisfied till it becomes possible for every home to buy and utilize the equipment which electrical science has and will make available. This is the largest single field of opportunity. Less than one per cent of the country's railroad mileage is electrified and but few of its terminals. The full utilization of electric power by factories is far from being accomplished. The lighting of the nation's network of highways and airways is just commencing. Radio broadcasting and the home movie give us but a faint opening of the curtain as to what future invention and discovery may bring forth.

Never has an industry, or a group of men connected with an industry, been able to look back upon a scene of accomplishment equal in contribution to the people of their country. No industry or group of people connected with it has ever been privileged to turn about and look forward with such hope and such confidence to the enormous contributions which still lie in their hands for further development.

We are concerned in the physical problems, in the financial aspects, in the economic interpretations—but of much greater moment is our feeling that, in the span of time allotted to us for the expenditure of our effort and the expression of our hearts, we are contributing to the forward march of this great country.

Public Utility Information Bureaus—AND WHY

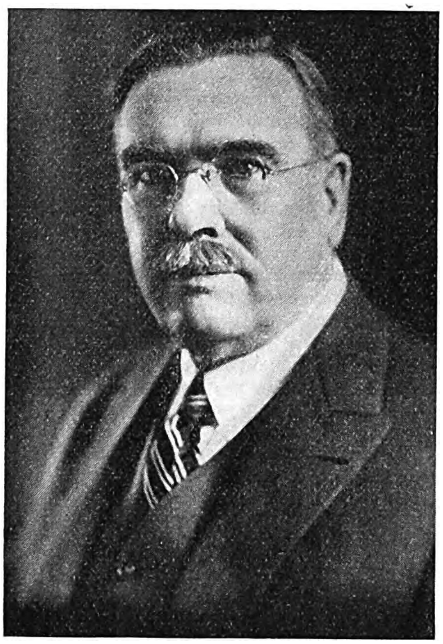
By Bernard J. Mullaney

FOR nearly a year the so-called State Bureaus on Public Utility Information have borne the brunt of the investigation into the alleged methods adopted by the light and power industry to combat municipal or government ownership and operation of public utilities which is being conducted by the Federal Trade Commission.

The implications in the manner in which the testimony of certain witnesses has been brought out, the exhibits which have been introduced entirely apart from their context and the accounts of the various hearing as reported by certain portions of the press, are obvious. The public has been led to understand that these Bureaus, as operated by managers or state directors, have been furnishing sinister propaganda to the newspapers without indicating its source, and that editors have been either innocently publishing it without dreaming that the public utilities themselves were its sponsors, or have been publishing it in response to improper or corrupt "influence;" that the bureaus have been furnishing material for use in the public schools intended to give both teachers and pupils an entirely erroneous conception of public service operation, again without indicating its source; that speakers have been furnished various kinds of civic organizations which presumably haven't even a speaking acquaintance with such a person as a public utility official; and doing all sorts of other things designed to keep the public satisfied with service of a much poorer quality than that to which it is entitled and at a price much higher than it should be asked to pay.

Suspicion Comparatively Recent

While I am familiar with the work of most of the state information bureaus, many of which are modeled after the one in Illinois, it is my intention to approach the subject in this article entirely from the standpoint of my own nine years' experience as Director of the Illinois Committee on Public Utility Information.



Mr. Mullaney is Vice-President of the Peoples Gas, Light and Coke Company, Chicago. He was largely instrumental in the formation of the Illinois Committee on Public Utility Information and has been its Director since its organization in 1919, *as the pioneer public utility information bureau. This article originally appeared in the Industrial Digest.*

I have no reason to believe that, except in isolated cases and incidents, other committees have not operated in much the same way. I wish to emphasize particularly the fact that our committee has been in existence nine years and that only during the past year has any question been raised as to the legitimacy, not to say the praiseworthiness, of its efforts. During these nine years every newspaper editor in the State has known of its existence and has never been in any doubt as to the source of the material which it has sent out from time to time, and it has never issued a line of so-called propaganda, to newspapers, teachers or anybody else, that was not conspicuously labeled.

The Illinois Committee was set up in 1919 "to make the public better acquainted with the fundamental economic facts of the public utility industry." Surely there can be nothing particularly reprehensible in such a purpose. It is a procedure which is being followed not only by every national industry in the United States but by thousands of individual manufacturers and other business enterprises. It is not only the basis of all advertising, whether direct or institutional, but it is also the basis of all publicity, whether governmental or private. It is anybody's and everybody's prescription of "pitiless publicity" and it has high acclaim—frequently—as when the late Judge Gary, of the United States Steel Corporation many years ago adopted the policy of taking the public into his confidence with regard to corporate affairs. As the doing of this has progressed, it has naturally included illustrative and expository use of collateral facts and circumstances.

There was a very good reason, in the spring of 1919, for the organization of the Illinois Committee. The public utility industry of the country generally was in difficulties. Labor, material and other operating costs had been doubled and trebled. Rates remained fixed and stationary at or near pre-war levels. Earnings were, in consequence, adversely affected; often disastrously.

Investor Confidence Essential

Utility development was all but stopped. The war had interrupted plant and equipment construction. This deficiency, plus the additional plant and equipment needed for new service demands, could not be supplied without new capital. The new capital could be obtained on feasible terms only by restoring credit and rewinning investor confidence on a basis of fair rate readjustments.

Most companies in all branches of the utility industry—gas, electric, telephone, electric railway, etc., were crippled. Some were being strangled. By March 15, 1919, upwards of 70 street railway systems were in receiverships and many others were near it. The street railway situation reacted upon all other utilities, correspondingly increasing their difficulties, and the general utility situation was, consequently, disturbing the entire financial and economic structure of the country.

President Wilson's cabinet (he was in Paris at the Peace Conference) found the situation grave enough to be taken up in his absence, to be discussed with him by cable, and to receive attention. The financial steadiness of the country was involved.

In Illinois the public utility companies faced a need of 75 million to 90 million dollars of new capital a year for at least five years to catch up with their new plant and equipment requirements. The state regulatory commission was slow to act, and such bodies always will be—inevitably—while government is political. When the public is unaware of the economic reasons for rate readjustments, it opposes them, and regulatory bodies cannot be expected to ignore such opposition.

In these circumstances the responsible managers of Illinois utilities determined to take their case directly to the people. They believed, as events proved true, that public understanding of the facts would end blind opposition to fair rate readjustments and would generally improve relations between companies, customers, regulatory bodies, and the public. Their double objective was to protect the existing property of their stockholder-owners and to hasten the plant extension and service improvements which the public interest was demanding.

Never Any Secret

This, then, was the genesis of the State Committee on Public Utility Information and the State Bureau of Public Utility Information operated by it. There has never been any secret about it and never any misunderstanding on the part of the public. Without public confidence and without a public understanding of the many financial and operating problems of the public utilities, there can be no progress in the industry. The meaning of this can be best understood when it is realized that the light and power industry alone is now requiring approximately 800 million dollars a year of new capital with which to meet the demands for additional service being made upon it throughout the country.

SHORT SERMONS

Just what is right in all cases we cannot foresee. We make mistakes. We try to correct them. By and large, looking over the quarter century with which I have been familiar, I am pleased with the rapid progress which we are making toward the right in business. We are not perfect and never shall be, but we are training young men with a sense of these great responsibilities, and we are providing them experience from our own mistakes.

As time goes on I feel that the right in business will more and more prevail. The larger business becomes the more scrupulously careful the administration of it will be. We have had much difficulty with questions of technical competence and moral responsibility in the offices of Aldermen, but we have had practically none in the great office of President of the United States. Somehow, as responsibility increases, men are found big enough to meet adequately the great questions of right and wrong which come to them. So I welcome big business and big responsibilities, not in the fear that it will make business wrong, but in the hope and belief that it will make business right.

—*Owen D. Young.*

* * * *

We may be sure that any opposition to industrial advancement which is made by men who see political advantage in it will fail to recommend itself to the common sense of the American people. The record of electricity supply in the United States is one of continuously better service at continuously lower rates. I believe that that record can be maintained and that it will be maintained by the men who made it, not by political meddlers.

—*Henry Ford.*

* * * *

If your goods are acceptable, or your services useful, you will receive a profit. If, on the other hand, your fellow-creatures decide (wisely or unwisely, it makes no matter) that they do not want your goods, or that they will get on better without your services, then you will make a loss. The profit-making system is the only one under which the consumer can be perfectly sure of obtaining the article he wants—any other scheme can only mean that he will have forced upon him the article which somebody else thinks he ought to want.

Working for a profit on an individualistic system also ensures that the people who receive the goods are the same as those who pay for them — a very important point. Based upon the interests of the consumer, it is the only system under which the consumer can ever stand a chance. We can make no money, we can do no good, unless we can persuade others to accept our services at the value that we and they jointly place upon them.

—*Ernest J. P. Benn, in "The Confessions of a Capitalist."*

Although the National Electric Light Association, the national organization of the light and power industry, has no control over these State Committees and State Bureaus, it has always urged upon them the policy which the Illinois Committee adopted for itself from the day of its organization. This is, to deal only in facts and to leave out of the picture anything which might seem to be political or controversial. When opinion or argument has been handled, it has been by direct quotation of a responsible person, organization or publication. The facts with which the committee has dealt fall naturally into three classes:

1. The details of utility operation and the inter-related economics of operating costs, rates, service, financing, fixed charges and return to investors, as accentuated by war consequences.

2. The fundamentals in which the utility industry differs generally from other industries and business, as: Regulation and the details thereof, fixed selling prices, new capital needs, high ratio of capital investment to turn-over, etc.

3. Origin and development history of the industry in its various branches, and its present stature and significance as the largest industry in the country, next to agriculture and railroads, with some five million direct security holder investors and many more millions financially interested indirectly, as owners of fire and life insurance policies, bank accounts, etc. Insurance companies, banks and other corporations are large holders of utilities' securities.

Means Used in Getting Facts to Public

What means has the Illinois Committee used to get the facts across to the public? It has made them available to anybody and everybody who might find them usable—writers, speakers. publicists, educators, public officials and, of course, newspapers and other periodicals. In so doing the public utility industry of Illinois has revealed itself and its workings to a degree never exceeded, if ever equaled, by any other industry. Nobody has been solicited to make use of this informative and expository material, in writing, speaking, printing or otherwise. It has been made available always, on a take-it-or-leave-it basis. It has had to win its own way by force of its inheritent importance or interest.

It has been said that the State Committees and the State Information Bureaus have been furnishing material to the newspapers and concealing its source. This is not an indictment of the public utilities—it is an almost comical indictment of the average newspaper editor—either that or downright libel, when sinister "influence" is imnewspaper man knows the utter futility plied. Every publicity man and every of sending any kind of a statement to a newspaper without giving its source. The person who does so with the hope of getting the statement printed is unsophisticated to a high degree. The editor who would print such a statement, without having some one to "hang it on," would soon find himself operating an elevator or cleaning up the city room after the staff had finished its work and gone home.

School Pamphlets

It has been said that the State Committees and the State Information Bureaus have distributed hundreds of thousands of pamphlets in the public schools designed to "pollute the source of education" and to instill in the minds of both teachers and pupils the idea that government ownership and operation is an exceedingly bad thing for the public generally, and socialistic in its tendencies, while private ownership and operation is the only sound policy to be followed by the American people.

Even the most superficial examination of these pamphlets—which I frankly admit have had very wide distribution, but only because they have been requested by school authorities all over the country—will show the utter absurdity of such a charge. It is exactly the same sort of material which will be found in the modern supplementary reader, except that in most cases it is more accurate, more detailed, better organized, and is written in a more interesting style. Much of it is so adaptable that it can be used in connection with the teaching of Geography, History, Civics, Popular Science or English, and it cannot help but give added zest to lessons in these subjects.

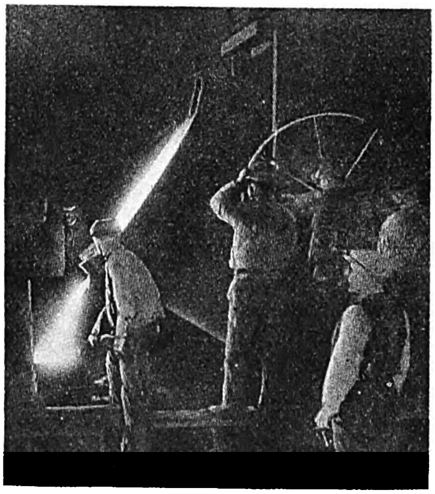
As to the ideas which these pamphlets may instill in the minds of the teachers and pupils, they are nothing more or less than factual information dramatized to make them impressive to both teacher and pupil. The preaching of any particular creed, social philosophy, or industrial policy has been carefully avoided. It is only by the widest stretch of the imagination that one could interpret any particular statement as an effort to condemn government ownership or to eulogize private ownership and operation of public utilities.

Educators Requested Material

The furnishing of this material was, in effect, initiated by educators and not by the public utilities. Superintendents, principals and teachers, from time to time, had requested first-hand information concerning these public services. This eventually led to the preparation of the pamphlets. In no instance are they distributed direct to the pupils, except upon individual request; the pamphlets are first submitted to the school authorities and, if approved, furnished free in such quantities as they may order.

Public utilities, in some localities, have been furnishing the public schools with this service for years without criticism, and in doing so they have done nothing which is not being done by almost every other American industry. There is this difference, however: the public utility pamphlets have been more strictly factual and less "propagandaish" than most of the others. For example, a survey of the public schools of Cleveland, Ohio, showed over 2200 separate items ranging from pamphlets to books, introduced into the schools by every conceivable industry and including all sorts of writings that were little more than straight advertising matter. Of these 2200 items, the light and power industry was responsible for just three pamphlets.

It has been said that the State Committees and State Bureaus make surveys of textbooks in use in the public schools, the implication being that the surveys were made for the purpose of "censoring" these books in order to eliminate from them anything which might seem to be inimical to the interests of public utilities. In Illinois we made a very complete survey of these books and the results were highly interesting. I can only say that I would advise every national industry to do the same thing if they wish to make sure that the coming generation is not being taught strange and curious things about their various activities.



Some Survey Results

The survey brought about some interesting disclosures. For example: plenty of government ownership propaganda in public and school libraries; little or nothing on the rise and development of utility service; practically no book or pamphlet literature on public utilities comparable to that available on banking, railroads, iron and steel, salesmanship, advertising, and so on; school textbooks utterly deficient and obsolete in relation to this great and pervasive industry.

Many of these textbooks had no mention of regulation, as now applied in nearly all states; no mention of theory and practice in utility operation as exists today. They discussed franchises, financing, rates, service and regulation in the terms of a dead and buried past. They expressed a distinct bias in favor of government ownership and they sometimes used language that would have been prima facie libelous if applied by name to persons or companies. And yet the critics of the light and power industry insist on the teaching of things to children which are not true or which, while they may have been true 25 years ago, are no longer true, and all because it is the industry itself which has attempted to call attention to many glaringly inaccurate statements about its own affairs.

The State Committees on Public Utility Information are rendering a very distinct service to the public and to the public utilities. One might write a book reciting economic facts of great significance to the people of the United States and which can only be given to them by the utilities themselves through some such agency. The right to continue this informative work is, now as always, unquestioned except by that small but vociferous group which seems to be engaged solely in an effort to tear down what other men have built. In a country less well informed they might be successful. It is the obligation of all business and industry to see that the country is kept informed.

An Invitation to Compete for the CHARLES A. COFFIN Medal

THE Charles A. Coffin Prize Committee of the National Electric Light Association cordially invites *all* electric light and power companies in the United States to make presentations of their accomplishments in connection with the award of the Charles A. Coffin Medal for 1928.

Under the terms of the Charles A. Coffin Foundation as established by the General Electric Company, the award will be made to that company which, during the year 1928, has made a *distinguished contribution* to the development of electric light and power for the convenience of the public and the benefit of the industry.

In order to aid the committee in its difficult task of bestowing the honors at its disposal, all companies are requested to list their achievements in accordance with the following outline:

Introduction

In the introduction there should be revealed the particular initiative, skill and enterprise which have been manifested in popularizing the general use of electrical energy and there should be emphasized the outstanding accomplishments of the company which, in the opinion of its officials, have done most to create and maintain a friendly public. As every operation of a Company bears upon its relation with the public, the section which has heretofore appeared in the Charles A. Coffin Foundation announcement, namely, "Public Relations" has been eliminated and each company is requested to reflect this fact in reporting on the three sections following. Mention should be made here of any one accomplishment and its related activities which the company considers entitled to the most consideration by the committee. Among the subjects, suggested for review by the company in its exhibit, are:

Section I—Accounting and General Administration Operations

Outstanding Accomplishments:

(a) Economies resulting from introduction of modern methods in customers' records and billing.

(b) Benefits which have accrued from improved collection methods.

(c) In improving personnel, office facilities and management and benefits which have accrued therefrom.

(d) In improving purchasing and store room records and operations.

(e) Improvements in capital records and development of statistical data.

(f) Results which have been obtained from educational facilities extended employees, building loan and similar operations, employee welfare work, group insurance, bonus plans and pensions.

(g) In improving institutional advertising.

(h) In improving transportation equipment and operations.

(i) In relations with the public and evidence thereof.

Section II—Commercial Progress

Outstanding Accomplishments:

(a) Promotional plans which have produced unusual increase in new customers.

(b) Promotional efforts to raise load factor of domestic consumers.

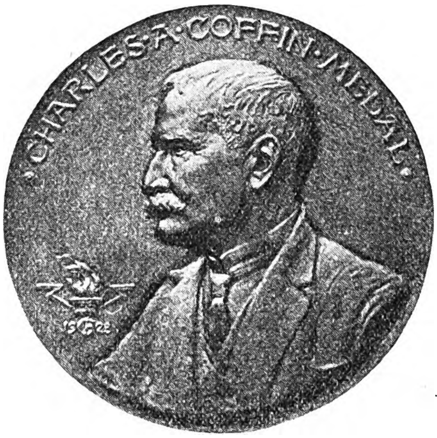
(c) Efforts and accomplishments in pioneering and popularizing electrical devices.

(d) Plans and results in selling greater use of light, heat and power in the commercial and industrial fields.

(e) Activities in farm electrification including the promotion of electric equipment on the farm and in the home.

(f) Methods used for coöperative promotion and selling of more adequate wiring, and electrical appliances, to develop better trade relations.

(g) Activities to develop better customer relations.



For having made a distinguished contribution to the development of electric light and power for the convenience of the public and the benefit of the industry, awards of the Charles A. Coffin Medal have been made to:

Southern California Edison Company for 1922.

Public Service Company of Northern Illinois for 1923.

Consumers Power Company for 1924.

Commonwealth Edison Company for 1925.

Edison Electric Illuminating Company of Boston for 1926.

Puget Sound Power and Light Company for 1927.

The Charles A. Coffin Medal is the most coveted prize bestowed within the industry and its award is a very great distinction to the company which succeeds in obtaining it. The exhibits are of great value and helpfulness to the industry as a whole and stimulate all of the companies to an even greater contribution to the development of the electric light and power industry. The exhibits made by companies in previous years are on file at the New York headquarters of the association and are available for inspection

Section III—Engineering Activities

Outstanding Accomplishments:

(a) In the field of generation, transmission, distribution, construction practice, etc.

(b) In improving overall efficiency as measured by kilowatts of system capacity per dollar of investment.

(c) In planning of system development.

(d) In improving reliability of service.

(e) In accident prevention.

(f) In relations with the public and with other utilities—telephone, telegraph, railway, etc.

It will be noted from the foregoing outline that the committee is principally interested in outstanding accomplishments resulting from a well developed plan. The companies are, however, requested to also give the comparative statistical data shown on the last page of the official invitation, which has been mailed to electric light and power companies.

While the exhibits and statements should relate to the year 1928, the committee will consider any achievement which, although the result of efforts of previous years, has manifestly reached its fruition during the past year.

The award of both the Charles A. Coffin Medal and the one thousand dollars for the employees' benefit fund will be made at the 1929 Convention of the National Electric Light Association.

The preference of the committee is that all presentations be made on standard typewritten sheets, accompanied by such exhibits as may be required.

All statements should be filed with the committee not later than April 1, 1929. These documents should be addressed to the Charles A. Coffin Prize Committee, National Electric Light Asciation, 420 Lexington Avenue, New York, N. Y.

(*Signed*)

P. S. Arkwright, *chairman, president of N. E. L. A.;* R. H. Ballard, *Chairman of Public Policy Committee;* Samuel W. Stratton, *President of Massachusetts Institute of Technology.*

The Louvain Memorial and What It Suggests

By William H. Onken, Jr.

PERMANENT friendship between the nations, an evangel preached with fervor by ardent souls in every country for a hundred years or more, is, we may surely hope, nearer accomplishment than ever before.

Such a prophecy may be unduly optimistic; but at least a basis can be found for it not so much in the reformation of governments or the absence of irritating factors similar to those which have produced war in the past, as in the enduring hatred of war engendered by that vast and terrible conflict that ended only a decade ago.

Indeed, one of the promising signs of the times is the fact that in every land the young man on whom the burden of fighting falls are losing the primitive impulse to "seek the bubble reputation in the cannon's mouth," and are satisfied to find opportunities to follow patriotic and heroic impulses while persevering in the paths of peace and in seeking to improve life rather than to destroy it.

However this may be, one thing is beyond peradventure: Between the United States and Belgium there will always be, as there always has been, profound peace based on mutual regard and unruffled by any diplomatic controversy.

BELGIUM, despite her two tongues and two races of Flemings and Walloons, is a small country. Only seven of our forty-eight states fall below it in area. Geographically, it is not quite the size of Maryland, and its eight million people are exceeded by the population of either New York or Pennsylvania.

But what a glorious history is crowded into that small territory, and what splendid activities are there embraced! From the day when Caesar recorded in his commentaries that of all the Teutonic tribes that withstood his legions, the Belgians were the bravest, to the day, so recent and yet so distant, when a startled world heard the guns at Liege roar defiance at the invader, valor has been Belgium's honor and her passport alike.

Mr. Onken is Senior Editor of the *Electrical World*. He was one of the delegates of the American Institute of Electrical Engineers at the dedication of the Louvain Memorial, held on the Fourth of July last year. As will be recalled, American engineers subscribed a fund for a memorial to our engineers who lost their lives in the war. This took the form of a carillon and clock erected in the tower of the library of the University of Louvain, Belgium. This address was made by Mr. Onken on Jan. 7 at a dinner held at the University Club, New York, and attended by fifty of the leading engineers of the country. The Committee on the War Memorial to American Engineers made its report on this occasion. At the dinner Prince Albert de Ligne, Belgian Ambassador to the United States, presented to Edward Dean Adams, chairman of the war memorial committee, the insignia of Commander of the Belgian Order of the Crown. In making the presentation Prince de Ligne expressed the gratitude of King Albert and the people of Belgium both for the good will of the donors and the choice of Louvain as the site of the memorial

Longfellow, singing of the belfries and the carillons that so enchant the traveller, tells how he—

> Beheld the Flemish weavers, with Namur and Juliers bold,
> Marching homeward from the bloody battle of the Spurs of Gold;
> Saw the fight at *Minnewater*, saw the White Hoods moving west,
> Saw great Artevelde victorious scale the Golden Dragon's nest,
> And again the whiskered Spaniard all the land with terror smote
> And again the wild alarm sounded from the tocsin's throat
> 'Till the bell of Ghent responded o'er lagoon and dike of sand:
> "I am Roland! I am Roland! there is victory in the land."

But Belgium's soil has been shaken many a time by the roar of strange cannon and the tramp of foreign feet. She has been sore tried, as it were, in the furnace of affliction and has drunk deep from the cup of adversity; but throughout it all she has maintained her spiritual life unblemished and undimmed.

MEN and nations have become great, not in proportion to the largeness, but in proportion to the smallness of their natural advantages. It is not size but valor that counts. The Persian hordes were driven back by ten thousand at Marathon and Greek culture and the world's civilization saved. William of Orange vanquished the mighty Philip of Spain when he tore down the dikes and buried the Netherlands beneath the waves of the sea. The Light Brigade at Balaklava will ever be remembered in story and song. And what of that great epic in the world's history fought on Belgium's soil? Not even the World War has dimmed the fame of Waterloo—the theme of Byron and Thackeray, Hugo and Stendhal and many another foreign author. A pall of blood and battle smoke hovered over Europe. Thrones tottered. The world wondered. Napoleon seemed unconquerable. Then came Waterloo and civilization resumed its joyful march.

Again in our day Belgium, through no fault of her own, was forced to become the "cockpit of Europe," and the fortress of the high fort of her walls was brought down, laid low, and brought to the ground, even to the dust. But to Belgium "the path of duty was the way to glory." From the East and from the West, from the North and from the South, whole nations rushed to her cause, determined to settle once for all whether might or right was to be leader of the world. Leige, Namur, Charleroi and Mons—what are they but the burial place of some of the noblest and best that Europe ever saw! But

> "They never fail who die
> In a great cause. The block may soak their gore;
> Their heads may sodden in the sun, their limbs
> Be strung to city gates and castle walls;
> But still their spirit walks abroad. Though years
> Elapse, and others share as dark a doom,
> They but augment the deep and sweeping thoughts
> Which overpower all others, and conduct
> The world at last to freedom."

And what shall be said of Louvain, from whose charred remains has risen a recreated city, glorious as the morning sun? Many of us have seen that city and the magnificent library which the Americans out of a free heart have erected there as a gift to the Belgian people. The building is a work of art, rivalling in grandeur the other great libraries of the world. It represents an ideal and the attainment within of that spiritual height which ennobles and endures. Petrified, indeed, must be the heart that catches none of the inspiration of such a temple.

OF a truth, "wisdom hath builded her house," and while the scholar furnished the means and the architect piled the stubborn stone into superb and stately proportions, it was the engineer who gave that magnificent tower its final majesty and rhythm, and lifted the environed human spirit toward that which transcends it.

That was an inspiration, you say? Aye, it was more than that. It was genius and labor combined and sanctified by a noble and god-like purpose. It furnishes one of the rare instances where engineers have departed from the cold intellectualism of pure and applied science to give expression to the loftier and nobler ideals of human activity and human sympathy. For of what profit is it to scientific men, physically and mentally, to develop and enrich civilization if they remain passive toward the higher arts and the humanities?

Hence the significance to American engineers of the memorial carillon and the greater circumstance of its placement in that ancient seat of learning at Louvain.

There "in notes by distance made more sweet" songs that nerve a nation's heart vibrate along the arch of heaven and neither men nor angels will let them pass into oblivion. And might I here pause to note, while memory is clear and events are still fresh, that to Edward Dean Adams we are beholden for the concept of the memorial.

THE carillon is "an outward sign of an inward and spiritual grace," and according to L. Van der Essen, secretary of the University, the ringing of the bells has absolutely transformed Louvain. And here note the deep religious sentiment with which the Belgian people view that memorial! "From a city which seemed dead and dull since 1914 when the carillon tumbled down under German fire," Professor Ven der Essen says, "It has now become a town full of memories." * * * "There has been a moment when every man of Louvain has had tears of emotion in his eyes. That was on August 4 last, at 9.30 in the morning, when, as every year since the war, all the bells of Louvain were ringing in memory of the violation of Belgian soil. When suddenly, the 'liberty bell' began to strike. overpowering all the other bells of the city, many persons ran to the Place du Peuple and stood there, looking at the tower, deeply moved as if the voice of the dead American engineers was spreading through the air and saying: 'This is the Liberty Bell now ringing in Free Belgium on this fateful fourth of August. Remember that we died so that you might live and be free.'

"The carillon," says Professor Van der Essen, "has now become in the everyday life of the people of Louvain what I would call a part of their soul. It would be henceforth unthinkable to have Louvain without that carillon, and when one is walking through the fields far out from the city, everywhere he sees that tower and carillon, and the aspect of Louvain with the Engineers' Memorial is now something of a perpetual remembrance of those great things which you intended the memorial should keep alive in our memory."

> O! who shall lightly say that Fame
> Is nothing but an empty name,
> When memory of the mighty dead
> To earthworn pilgrim's wistful eye
> The brightest rays of cheering shed
> That point to immortality?

Tree and vine and flower and shrub now cover the place made desolate by torch and shrapnel and contending armies, and as nature covers the shell-holes and trenches and graves with a verdant green, so time has softened and mellowed the passions and hatreds engendered by that stupendous strife.

On an old stone in an English churchyard will be found this epitaph:

> "He who saves loses; he who spends
> saves, and he who gives away takes
> it with him."

Our engineers gave away their lives and took with them immortal glory and the undying gratitude of millions of people.

But if in the annals of war Belgium has a foremost place, in the annals of peace she deserves recognition out of all proportion to her relative size. In the art of painting she may boast such old Flemish masters as Rubens and VanDyck. A long line of poets and prose-masters has culminated in the twentieth century in men of such world-fame as VanHaeren and Maeterlinck, while in the severer field of political economy the late Emile Laveleye stood in the foremost ranks.

BELGIUM has today four great universities, including the University of Louvain, now a second or adopted Alma Mater, as it were, to every American engineer. She has her Royal Academy of Fine Arts at Antwerp, that great European port where antiquity and industry jostle each other, and her Royal Conservatories of Music in Brussels. that resplendent capital; in Antwerp. in historic Ghent, and in heroic Liege. She has scores of cultural institutions less only than these, and on the other side of life's tapestry she has her mines and her manufactures and her engineering enterprises.

First to suffer in the great war. Belgium was the first of the devastated nations to recover. Most densely populated of European countries, she is among those where prosperity is most general and most evenly distributed. When we hear the "Brabanconne" there comes to our minds the vision of an industrious, pious and naturally peaceful people, united in spite of their racial diversity, and guided by men like Albert, of Flanders and Minnesota, who has proved himself a wise statesman as well as a brave king, and the late Cardinal Mercier, beloved and honored of all mankind.

To have aided in ever so unimportant a degree in insuring for Belgium a future tradition as certain as those of her past, will be worth in satisfaction to America's engineers a hundred times the efforts that they made.

And when we contemplate the memorial at Louvain and listen to its enchanting music may we repeat

> "Their song to us descendeth
> The Spirit who in them did sing
> To us his music lendeth
> His song in them, in us, is one;
> We raise it high, we send it on,
> The song that never endeth."

WILLIS R. WHITNEY—A Moulder of Genius

By MAURICE HOLLAND

A chapter from INDUSTRIAL EXPLORERS, by Maurice Holland, in collaboration with Henry F. Pringle. Published by Harper & Brothers. Reprinted by permission of author and publishers. Copyright by Harper & Brothers, New York

WILLIS R. WHITNEY, of the General Electric laboratories at Schenectady, N. Y., is undoubtedly the best beloved of all the remarkable men who are the crowned heads in the world of research. One says this without hesitation or fear of contradiction, for it seems to be the unanimous opinion of all his fellow monarchs. Many a scientist, scheduled to make the address of the evening on some solemn occasion when a medal is being presented, has intended to hold forth on Whitney's technical achievements, but has dwelt for an hour, instead, on the man's human, lovable qualities. In another decade or so, perhaps, Whitney will close his desk and will retire to his farm on the Troy road, there to continue private explorations into the realms of truth. If he does, and if a farewell dinner is given by his associates, the orator of the evening will have the unenviable task of finding something new to say. Flowers are invariably tossed when Whitney is spoken of.

HE is taller than the average, quick in movement, with dark hair beginning to grow thin and eyes that reveal inner energy, vitality, and joy in life. He seems always to be in an enthusiastic glow about somethiing — science, truth, education, the cosmos, turtle husbandry, some experiment of promise. So marked is the simplicity of his manner, and so hearty and informal his greeting, that it is difficult for the casual visitor to realize that this is a world-renowned scientist, the recipient of many degrees and medals, a man whose words are respected in the gatherings of grave and distinguished men. Not until he has been talking for a moment or two does it become clear that he thinks with the cold, bright logic of those who build dreams only on demonstrable facts.

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Among all the traits men treasure in their fellows there is none more enduring than generosity. This Whitney has to an almost fanatical degree. He is constantly sought by men from the factory or engineering department for his opinion, advice or other help, and he always give freely, without showing the eagerness he feels to get into the laboratories, to observe and talk over the experiments going on there, where he feels his real work to be. There is not an experimenter on the staff who has not felt the stimulus of his interest, the encouragement of his understanding, the helpfulness of his pointed suggestion. It may be only his suggestion, born of knowledge and broad experience, that has made possible the solution of some knotty problem, but seldom, indeed, is this known except to the man who has received it. But, you say, this urge to help is only part of his job. Then what about the man who writes to say that he has a good opening for a competent chemist and would appreciate Whitney's suggestions? Invariably, if the opening is an attractive one, that man is invited to come to Schenectady to become acquainted with all the men there who might fit the position. "I don't want to lose Smith, Brown, or Jones. They are doing good work here. But if you can persuade one of them to leave he will go with my blessing," is apt to be Whitney's generous response. Rarely, be it said, is a man persuaded, but the desire to help his men to greater opportunities, either within or without the organization, is never lacking. There is here a fundamental generosity of the spirit that makes for better understanding in every contact. It is this quality that prompted Whitney to say, in effect, in initiating the work of the laboratory, here is one industrial research laboratory which will welcome visiting scientists and will publish its experimental results just as rapidly as they can be published without injury to the interests of the company's stockholders.

WHITNEY'S popularity, then, is based partly on his generosity. Obviously he is a busy man, but he always has time to see the most unimportant caller. "Come in, Rain or Shine," is the sign lettered on the door of his private office, an invitation upon which he insisted against the wishes of his secretary and assistants. He sincerely dislikes personal publicity, but the magazine writer or reporter who says that an interview can be sold for a good sum is not likely to be disappointed.

"The chap said he could get $100 for it," remarked Whitney, a little plaintively, after one long session with a rather importunate reporter. "What else could I do?"

Whitney picks good men and loads them up with all the responsibility they will carry. But he himself is the first to enter the laboratory in the morning and the last to leave it at night. A tireless worker, a constant source of inspiration for his associates who work, not for him, but with him.

Whitney's generosity, his quick sense of the ludicrous or absurd, and a certain assumed irresponsibility combine to make him beloved. But the universal respect in which he is held by his fellow scientists in this country and abroad is based on his profound knowledge and of the manner in which he inspires his colleagues to new bursts of endeavor. Restless, active, constantly on the move, Whitney is to be found in all parts of the huge G. E. laboratory. One day he is standing near the lead shield watching Coolidge hurl his cathode rays against a diamond lent by George F. Kunz of Tiffany's. The next he is bending over Langmuir, watching the experiments with gases, optimistic that progress is being made. Whitney is here, there, everywhere, to the distraction of Miss Christie, his secretary. Sometimes he is down in the basement, where, in electric furnaces, tungsten is being drawn into fine wire. Sometimes he is at the shoulder of a junior member of his staff, a young man working with a microscope. And if he is not in a laboratory he is at his desk talking with some one about the work that is going on. Always he is molding men, always creating and maintaining that atmosphere of harmony and cooperation which makes the G. E. laboratory known throughout the world.

As a result of his personality and his passionate devotion to the cause of research, Whitney is called upon to make innumerable speeches before civic associations and at universities and colleges. He hates having to speak and has expressed the wish that an automatic talking machine might be substituted; one which would make appropriate gestures and speak in clear, fluent, even eloquent tones. But, lacking such a machine, he must often yield to the constant pressure, growing stronger every year, despite his protestations that he is a poor speaker. His audiences seem to feel otherwise.

Whitney's addresses reveal many fascinating things concerning his mind. They demonstrate that he is a broadly educated person, that his knowledge is not limited to chemistry and physics. He has pondered the mysteries of anthropology. He finds gratification in the fact that "the arrival of the vertebrates slowly brought forth brains," that "Herodotus, Socrates, Xenophon, Plato, and Aristotle" were "our first and leading phychological engineers" who started the doctrine of "Know then thyself." He realizes that the miracles of science are giving men time to think. When he thinks of "men" he includes women, too.

"Let her experiment," he said in a talk to the girls at Vassar, in touching on the new woman, "and, whether the researches be on dresses or eugenics, in politics or industry, the direction will be right."

It is, he went on, "an interesting young world" we live in, and the miracles of today are the commonplaces of tomorrow. The danger is that "we do not appreciate what we so easily discover." At this moment "a man's voice may penetrate to all parts of the earth, but where is the man to say the things worth every one's hearing?" Whitney is, it appears, no narrow specialist in the fields of physics and chemistry; he is a philosopher in the true sense, a man who loves wisdom for its own sake.

It is almost superfluous to point out that the traits and characteristics found in the Whitney of today had their beginning in his youth. He has remarked that he is "at a loss to know why so many men go through college keeping their eyes mainly on a ball of some kind when the world is so full of greater interest." From this, one concludes, and correctly, that the youthful Whitney was rated as a serious lad by his companions. He was born in 1868, at Jamestown, N. Y., that city not far from the blue waters of Chautauqua Lake, not far from the fields where sprang up discussion groups at which men talked of religion, morals, and other mysteries and where the Chautauqua Idea had its birth. More than half a century later, ill at ease because he had to make a speech, Whitney stood up to receive the Perkin Medal, a badge of knighthood in American industry, for his work in stimulating research. Sir William Perkin, he said, had become a chemist "through the influence of an Englishman named Hall, with whom he came into contact when under fifteen years of age."

"I have the honor," Whitney continued, "to have started as a chemist in this identical manner, and I will tell a little more about it, because I have always wished I had some way of expressing my gratitude to my particular Mr. Hall.

"When I was about fifteen years old a mill owner and one of the leading citizens of my home town, William C. J. Hall, assisted in establishing a Young Men's Christian Association. He had also long been interested in the microscope and was a scientist such as we seldom find among business men today. He formed a free evening class for about half a dozen boys—all that could work together around the rotating table on which he placed his immense microscope. This was so arranged that specimen, instrument, and illuminating system did not have to be disturbed as they passed from one boy to another for observation. He did not merely show his specimens, of which he had thousands, but he taught us how to prepare them in all the various ways, now more or less common. They were wonderful to me, and still are.

"My mother gave me some money which, combined with that of one of the other boys, purchased a small microtome, and my father gave me $75 for a microscope. Under Mr. Hall's guidance I bought the instrument, with the understanding that whenever I wanted a better one the old one would be taken back at the original price. I later procured one for $250 which, throughout thirty-five years, I have used almost daily. One of the first experiments I tried with the microscope was to precipitate metallic silver from silver nitrate solution onto a speck of copper filings. Any one who has watched these beautiful crystals grow knows that they are surpassingly wonderful. They constituted my first chemistry. It was those little bottles of salts and bugs in alcohol that led some one to call me a chemist, and it apparently determined my future work.

"It does not seem now as though any one else ever enjoyed a tenth of the pleasures my old microscope introduced to me. I find them inseparably interwoven with about everything I know. Even the barren North Pole reminds me of Andrée and Amundsen and microscopic algæ which drifted across the polar circle from the Lena delta. The equally barren Sahara reminds me of Darwin and De Vries and the diatoms which were carried by the wind from central Africa and fell on the deck of the Beagle, hundreds of miles away."

Whitney began to ride a hobby, evidently, at the age of fifteen. He has been riding one ever since. The nature of the hobby is less important. Whitney is not particular so long as it offers another outlet for his inquiring mind. Once he devoted all of his spare time to looking for Indian arrowheads. He would spend entire days tramping through field and meadow, and when he had found one he would examine it, classify it, learn everything there was to know about it. Then he would compare it with crude tools used by prehistoric men, would dig through musty volumes dealing with anthropology. Another time he became fascinated by turtles and raised quantities of them on his farm. He learned of their private habits, their life-span, their characteristics. Some years ago he was forced to make a trip to the West in connection with the work of his laboratory. On the way out he made several speeches, and on the return trip stopped off to attend scientific meetings. His chief anxiety, however, was to get back home before the turtles came from their places of hibernation, and he was delighted when this turned out to be possible. He has experimented with numerous agricultural problems, and is actively interested in the application of various physical agencies to the treatment of human ills. He is a student of heredity. And he does all these things, not as a faddist who takes up one subject to drop it for another, but as a serious student. Nothing in nature is alien to him; everything is filled with possibilities that are startling and beautiful. Withal, as we have seen, he is a jovial soul. He has complained, in at least one solemn address, that it is difficult for him to keep from "being facetious." He is said to have dodged several technical powwows to attend a musical show.

SOME day a book will have to be written about Whitney, for the many sides of his character cannot adequately be told in a few thousand words. No doubt, the most accurate summation of him would be to say that he feels deeply on all things. No one who did not could say, as Whitney has, that "the only perpetual motion is the growth of truth." Another way to offer a portrait of Whitney's nature is to say arduous if through it young men can be taught. He is a member of the board of governors of Union University, a trustee of Union College and of the Albany Medical College, and was, for ten years, a member of the Corporation of the Massachusetts Institute of Technology. There is slight doubt that he would withdraw, without hesitation, from the General Electric Company and again go to teaching were he to decide that in such a way the education of young men could better be advanced.

He began as a teacher, in the days before industrial research, as it is known today, had been thought of. He had been graduated from M. I. T. in 1890, with the degree of S.B., and was immediately appointed assistant instructor in chemistry. His formal education was, however, far from complete and he spent two years at Leipzig and received the degree of Ph.D. in 1894. He also studied in Paris. It does not seem to have bothered him that progress in an educational institution is slow. He was content to accept, in 1895, the job of instructor at M. I. T., and that of professor in 1901. He has recalled that he once asked for a salary increase of $75 a year and did not receive it, and he thinks that he learned thereby that "financial rewards are not the main thing." His chief recollection of his early days is one of gratitude for the inspiration he received from his teachers. Professor A. A. Noyes, of Tech, he has said, liberated him "forever from the wiles of college football." He had been experimenting with Noyes and had planned to attend a Harvard-Princeton game. The experiment proved so fascinating that he forgot all about the game.

WILLIS R. WHITNEY

It is incredible, in the light of the position held by scientific research in industry today, that it was almost an unknown thing in 1900. Of course, there were experimental laboratories in some of the larger plants, but these existed chiefly for the purpose of assisting in manufacturing processes. They were "trouble stations," called when something went wrong. What is now known as research was then the unchallenged province of the inventor. It was not until 1904 that Frank B. Jewett, another M. I. T. man, was called to take charge of the research work of the American Telephone and Telegraph Company. Whitney, asked to organize the General Electric laboratories in 1900, has seen research in industry develop before his eyes. And the research laboratory at Schenectady will be, despite his varied work in many fields, his most enduring monument.

WHITNEY must have known what this laboratory was going to mean. Even in 1900, he looked into the future and saw an industrial laboratory in which pure science would be encouraged. Nothing else would have called him from teaching, a field where young men could be inspired and where, at the same time, truth could be sought for its own sake. Several years before that he had been offered a position by Arthur D. Little, of Cambridge, and had declined, saying he would "rather teach than be President." On another occasion he had remarked that unless there were "problems to be solved in Heaven," he did not desire to go there when he died.

Whitney is able always to be attacking problems, many of them in the field of abstract science, because so many of the everyday details of laboratory operation are handled with efficiency and dispatch by Hawkins, his research engineer. Hawkins is, in many ways, as busy a man as Whitney himself. He must attend to a thousand details, obtain the needful appropriations, adjust complaints, supervise the purchase of equipment and other expenditures, keep things running. He commands the Service of Supply. And yet he has, no less than the director of the laboratory, a clear vision of the true significance of research. Hawkins has said that research is "simply an exploration, a systematized search." It goes on "whether or not what is found is eventually applied." Research is "not the obtaining of additional data regarding what is already known; it is the exploring the unknown for generic facts or principles." It "seeks the new knowledge which makes new things possible."

Such, with a personal leaning toward the acquisition of knowledge for its own sake, was the vision of Whitney when he assumed charge of the new laboratory in 1900. In his direction of the laboratory activities, he is not commercially minded in the sense that he must see an immediate profit from each undertaking. He has the broader vision that sees that the greatest ultimate results come from the scientific pioneering which opens broad new fields of knowledge, but which cannot be expected to yield immediate financial returns. His point of view was clearly demonstrated when, in the summer of 1909, Dr. Irving Langmuir came to the laboratory.

LANGMUIR had been teaching chemistry at Stevens Institute and expected to return to his post in the fall. Arriving at Schenectady, he was told by Whitney to look around and determine what interested him most. He noticed that many of the men on the staff were working on the development of drawn tungsten wire under a process devised by Coolidge, and Langmuir suggested that some of the difficulties being experienced might be due to impurities in the wire. There might be, he thought, certain gases present. His work proved so interesting that Langmuir was glad to resign from the Stevens faculty to continue his purely theoretical researches. No definite program was assigned. He was even given assistants to aid in the study of gases, merely to see what would happen when he introduced them into the lamps.

"During these first few years," he has recalled, "while I was thus having such a good time satisfying my curiosity and publishing scientific papers on chemical reactions at low pressures, I frequently wondered whether it was fair that I should spend my whole time in an industrial organization on such purely scientific work, for I confess I didn't see what applications could be made of it, nor did I even have any applications in mind. Several times I talked the matter over with Dr. Whitney, saying I could not tell where this work was going to lead us. He replied that it should lead anywhere. He would like to see me continue working along any fundamental lines that would give us more information in regard to the phenomena taking place in incandescent lamps, and that I should feel myself perfectly free to go ahead on any such lines that seemed of interest to me. For nearly three years I worked in this way with several assistants before any real application was made of my work. In adopting this attitude Dr. Whitney showed himself to be a real pioneer in the new type of modern industrial research."

In the end, of course, this virtue brought its reward in millions. Langmuir was the first to apply argon and nitrogen to tungsten lamps, and nearly 1,000 million of the new lamps have been made in the United States. The American public has been saved $1,000,000 a night on its lighting bill.

Similarly, in the case of the Langmuir radio power tubes, the General Electric laboratory demonstrated that apparently unrelated research may well lead to a device of outstanding industrial importance. Langmuir, scholar and explorer, studied electron emissions and perfected a power tube capable of amplifying high-frequency current in amounts requisite for radio transmission. If research yields new knowledge in fundamentals, there is no need to worry about its application.

THE genius of the gentle and amiable Coolidge is just another example of this. He was studying the phenomena of electron discharges in high vacuum, and his new X-ray tube has virtually displaced all other types. It has been developed in sizes up to 250,000 volts and down to a dental tube so small that both it and its transformer can be inclosed in an oilfilled metal casing and swung on a wall-bracket or carried like a hand bag. Now Coolidge is playing with cathode rays developed by giant tubes. No one knows quite where this cathode ray work is leading. No one, if the enthusiastic interest at Schenectady is any indication, worries greatly. The effect of these cathode rays is equal to that of a ton of radium. Its significance is still clouded with doubt, but untold possibilities lie in the new lands which this explorer is beginning to enter. Germs and spores have been killed by an exposure of less than a second. It has been possible to produce the vitamin which cures rickets. The rays have been found to be powerful catalytic agents. It is not impossible that new forms of energy will be discovered and a new world created. Meanwhile Coolidge is stepping up his voltages, building larger tubes, wondering what will happen when he has reached 7,000,000 volts!

But the story of the General Electric laboratory, like that of Whitney himself, needs a volume for its telling. Of all of this work Whitney is the inspiration. He writes papers and makes speeches, sometimes with amazingly revealing titles like "Vacuum, There's Something In It," and "Aristotle was

Electricana

"A professor of Harvard University has sent Mr. Edison 50 specimens of fibres to test for the carbon horseshoe instead of the paper formerly used. Amongst those who have the best opportunity of judging what he has done, or is likely to do, little hope seems to remain of his ultimately attaining success with his incandescent lamps."—*The London Standard,* 1879.

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Heh, Heh, Heh!

IN DARKEST AFRICA

"Dr. Harold Gifford of Omaha, Neb., one of the League's most faithful supporters and president of the Nebraska Public Ownership League, recently returned from a trip through South Africa. Upon his return he wrote us as follows:

"'I am more than ever impressed with the importance of public ownership, and was surprised and pleased to find that in South Africa they are far ahead of us in this respect. All the railroads, telegraphs, etc., are government owned and run.

"'In Durban, and I think in the other large cities, all public utilities are publicly owned. Durban has its own street cars, water works, light and power, public abattoir and fertilizing works. The latter two are conducted without any bad smells, just as our packing houses could be made to do if we made them as clean.

"'In Durban, they also run a brewery for the natives, who had formerly been getting their beer (pombe) at private joints where they were constantly getting into trouble. Now they get it at the public breweries or not at all. They are not given more than so much a day, and can get with the beer a very hearty meal for about seven cents.' "—From *Public Ownership,* official organ of the Public Ownership League of America.

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Is this an argument for public ownership?

A MODERN MILKMAID

Modern version of an old rhyme:
"Where are you going, my pretty maid?"
"I am going to oil the bearings on the electric milking machine, sir," she said.

Recent drolleries attributed to Mazda Lane. Compiled by S. E. D.:

Don't be a dim bulb all your life, dearie.

We call him Bulb, because he goes out so often.

His eyes look like a couple of empty light sockets.

I hope to broadcast myself hoarse, it is!

It may be the greatest circuit in the country for some, but it's going to be a short circuit for me.

Own your own Ohm.

What's the voltage of this liquor, anyway?

He was so dumb he thought that "A. C." meant Athletic Club, and that "D. C." stood for District of Columbia.

WHERE MEN ARE MEN!

"Hello, old man, where have you been?"

"Just got back from a camping trip."

"Roughing it, eh?"

"You bet! Why, one day our portable dynamo went on the bum and we had no hot water, heat, electric lights, ice or radio for almost two hours."

There is a striking decrease in the number of municipal plants in many states, according to *Electrical News Items* which quotes the U. S. Bureau of the Census as saying that this is "due to the abandonment of municipal generating stations and the acquisition of municipal distributing lines by commercial systems."

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To a regular reader of the published reports of the Public Ownership League of America it seems that there just must be something wrong with ELECTRICAL NEWS ITEMS, or the U. S. Bureau of the Census, or both.

GOVERNMENT (POLITICAL) OWNERSHIP AND OPERATION AND THE ELECTRIC LIGHT AND POWER INDUSTRY

Published the first of the year and now available at the headquarters of the National Electric Light Association.

Contains 530 pages devoted to the intrusion of government into business and the municipal operation of electric light and power plants. Chapters on:

1. History of Political Ownership and Operation.
2. Questions Usually Asked About Political Ownership and Operation.
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4. Municipalities which have abandoned, sold or leased their electric plants to private companies. Municipal distributing systems (where municipalities had no generating plants) sold or leased to private companies.
5. Municipalities which have abandoned, sold or leased their generating plants and are now purchasing power wholesale from private companies, but which still own and operate the distribution systems.
6. Bibliography.
7. Index.

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Right." There are at the present time about 400 men and women employed in the laboratory, about half of them scientists. Whitney knows all of them personally, however. When some new man is taken on it is not long before the director has dropped into his laboratory to see how his work is coming on. He is cheerful, encouraging, optimistic. He seems to spread hope and faith wherever he goes. And he knows, in some uncanny fashion, everything that goes on. Whitney is, perhaps, more like Coolidge than Langmuir in temperament. The latter is rather too systematic for Whitney's volatile nature. Langmuir sometimes insists that some particular path is not worth following. Whitney, without thinking about it, sees red when he is told that something cannot be done, and occasionally the laboratory is vastly entertained by a brisk row between the two men. They are, it is needless to say, devoted friends.

Coolidge says, "It's because Dr. Whitney is there that Langmuir and I can play around. He stands between us and the demands that we do something practical."

IT is hard to believe, looking at Whitney, that he is sixty years old. His vigor is that of a man of forty; his curiosity that of a child asking questions about the winds, the rains, and the beams of light that slant down across a room from a window. Of course, he takes pride in the laboratories he has built and the organization he has developed. Naturally, he rejoices that it was possible to leave the realm of teaching and find that a great industrial corporation would encourage the search of truth. From time to time another medal is presented to him and the orator of the evening again tells of Whitney's profound knowledge, his lovable traits, his generosity. But Whitney best described himself, unconscious as he may have been of that fact, when Langmuir was the guest of honor and received a medal on a night in March of 1928. On that occasion he said, in part:

"THERE is something in Langmuir's work that suggests, by sharp contrast, an Oriental crystal gazer seated idly before a transparent globe and trying to read the future without doing anything about it—a hopeless philosophy. In my picture an equally transparent and more vacuous globe takes the place of the conventional crystal sphere. It is a lamp bulb, a real light source. Langmuir boldly takes it in his hand, not as some apathetic or ascetic yogi, but more like a healthy boy analyzing a new toy, even as Langmuir himself studied and fixed the complex watch of his boyhood days, but seeing visions, too, of many new things. There might have been nothing in that vacuum, but he was driven by insatiable curiosity to investigate and learn for himself.

"Thus he peopled that empty space with new and strange little beings or personalities which he had first dreamed of, then devised, and finally endowed with real character—and all this solely to make his various dreams come true. He first dreamed that tungsten atoms were being carried by foreign atoms (of oxygen) from the filament to the glass to obstruct the light. He dreamed of banishing or imprisoning these, and when he made this dream come true we got good, clear, long-lived tungsten lamps.

"Still Langmuir dreamed, with both eyes on the ball, of a greater light. Therefore he populated the lamp bulb with new beings, rare gases of dependable character, like nitrogen or argon. By this method the light he foresaw in the bulb became just twice as great as it was before, and all of us now easily see it, and the world is glad to pay for it.

"Gazing into the same sphere again, he dreamed about disembodied electricity, and soon the reliable little electrons were tamely obeying special laws —laws that had never been known before and that most men do not yet understand. He gazed again and saw atoms cooperating with his electrons, so that he was able to add to the thermionic servants of the radio sphere accurately controlled groups of electrical helpers in the shape of gas ions, and thus he continually improved radio tubes.

"Here lies the difference between the ancient and the modern seers or prophets. The modern prophet is a doer. No one can fix the best ratio between thinking and doing. The pure thinker is apt to think too much, and the active man to be too active. Evidently that Mendelian law which determines mutations and produces increased strength by cross-breeding explains why a certain mixture of thinking and acting yields the greatest product. I know of no one who seems to combine these two characteristics in better balanced ratio than Langmuir."

On the Occasion of a Ground Breaking

Truths of more than local application uttered by A. W. ROBERTSON, President of the Philadelphia Company at ground breaking ceremony of the proposed power station of the Duquesne Light Company at Brunot Island, near Pittsburgh, Pennsylvania. Since this occasion, Mr. Robertson has become Chairman of the Board of the Westinghouse Electric and Manufacturing Company

ON this spot will be built a giant power station. Its foundation will rest far below on the granite rocks. It will tower above us, beautiful and massive in its outline. The immense brick building will house great boilers and mysterious machines. From this point electric current will flow out to Pittsburgh's mills, factories, offices and homes. Here will be the center of 400,000 hp. of energy tamed, ready to serve the community.

Some will see only money, money, money, in the project, and it is true that money can be found at every stage. The investors who will furnish the money to build the plant will be looking for a profit on their investment. The company expects to use the plant to make a profit to pay the investors who have furnished the money for the plant; and that who buy the electric current expect to use it to make money or save money. As a business proposition this must necessarily be so, for if the plant is not a financial success, there would be no known way of keeping it in operation.

BUT there will be many unseen things here also. Within the plant we will find the inventive genius of the Edisons and Westinghouses of the electric world embodied in many wonderful devices. The results of many master minds will be here. The hopes and aspirations of Mr. Callery, former president of the Duquesne Light Company, are blossoming here. Here will be found the latest and noblest conquest of man over the laws of nature. In this plant will be found the hopes and aspirations of thousands of men who have spent their days in laboratories and in research to the end that the giant electricity, which has slumbered in the bosom of the universe for so many ages, be tamed and harnessed to serve mankind.

One often hears fathers say to sons, "Things come easy now," and I am reminded of this thought by the confidence with which we plan this power station. We haven't the money to build it this minute, but we have surveyed the development and growth of the Pittsburgh district and are certain that it will need additional electrical capacity in 1930 and we are going ahead with perfect confidence that we will be able to get the money to build the plant and earn a return on the cost of the plant after it is completed.

The money to build the plant must come from many different people. The investments in public utilities are so huge that they never can be financed out of earnings; and the company must sell bonds and stocks to get extra money to make additions and betterments. We will get the money from big and little investors the country over. If we get it, and we will, it will be for one reason; and that reason is that those men and women who have saved money and want to invest it, think it will be safe with the Duquesne Light Company in Pittsburgh. That is, safe with the Duquesne Light Company and safe with Pittsburgh. If the company were some other company we might not be able to get the money. If the company were in some other place, we might not be able to get the money. Both the company and the place where it is located are of vital importance. If these potential investors did not think it would be safe with us, and by us, I mean Pittsburgh and the Duquesne Light Company, we could not get one penny and you would never see here what we have said you will see.

This power plant, in a sense, is possible only because of the mutual confidence which pervades the whole situation including investors, community and company. It is a magic circle in which Pittsburgh looks to the Duquesne Light Company for power for every purpose and is not disappointed. The mills, factories, offices, and homes depend upon it almost as much as we depend upon the air we breathe. And, in turn, the Duquesne Light Company depends upon Pittsburgh to help it protect and guard the great investment of others' money it has made here. The investor trusts both the company and community with what may be the savings of a life time. And, knowing this, we plan with confidence this new power plant, costing many millions of dollars, to serve Pittsburgh in 1930. It will take the place of hundreds of power plants scattered throughout the territory.

IT will be seen that the management of the Duquesne Light Company occupies a position of trusteeship in which it must be faithful and look after the interests of the consumers who depend upon it. Millions upon millions of investments of consumers would be lost if the Duquesne Light Company service failed. The management must be faithful also and look after the interests of the investors who furnish the money for the plants such as this. Millions upon millions of money of investors would be lost if the Duquesne Light service failed. And the management must be faithful and look after the interests of thousands of its own employees who devote their lives to maintaining the service of the company; and it is significant that these three groups are made up of many individuals and small groups. In other words, the company is owned by many investors and employs many persons to serve many consumers.

These three duties of management must be harmonized and serve impartially, and all successful managements realize this triple trusteeship and measure up to the requirements as best they can, reconciling conflicting interests wherever necessary.

This thought of trusteeship in public service management brings us naturally to the great name which this station will bear. It will be known as the JAMES H. REED POWER STATION of the Duquesne Light Company. It is named after our dear friend and associate familiarly known as "Judge Reed," who, for a quarter of a century, was either president or senior

(*Continued on page* 113)

Central Stations Think *They Are Interested in*

ELECTRICAL ADVERTISING

But They Don't Realize What the Possibilities Are

By JOHN F. GILCHRIST

THE handwriting on the wall at Belshazzar's feast some three thousand years ago is the first record we have of an illuminated sky sign. From that early example there has been a great development, bringing the art up to its present standard as viewed in the theater district of Broadway and other similar centers in the great communities of today. Practically all of this development has been in the last forty years. The first outdoor electric signs in Chicago which I can remember were two placed on the Jackson Boulevard canopy of the old Grand Pacific Hotel in the summer of 1888 by supporters of Senator Allison of Iowa in his race for the Republican presidential nomination. They were crude receptacle sockets fastened to the face of a broad pine board and equipped with lamps of that period, the point of the lamp being probably ten inches in front of the face of the board.

Electricity is one of the greatest mediums for advertising. Perhaps it is the greatest of all. But it has not been developed as it should be. We people in this business control it; the fault is all ours.

From One Development to Another

There are so many developments for the use of electricity for the benefit of mankind (and they have come so rapidly and each is so interesting, even fascinating) that we have jumped from one development to another, and all but the latest have been neglected.

It is time that we organized departments of high-grade men to specialize each in its branch of exploitation work. Then we will get the real development which each of these wonderful human helpmates is entitled to.

We are told the advertising bill of the United States reaches the stupendous sum of $1,300,000,000 per annum. I myself think it is more than that, perhaps as much as $2,000,000,000, more anyway than all the money paid to the utilities for electricity in the nation.

A past president of the National Electric Light Association, Mr. Gilchrist has taken part in many association activities. He has been with the Commonwealth Edison Company and its predecessor, the Chicago Edison Company, during his entire business career. Beginning as an office boy in 1887 he has had in his climb to a vice-presidency of the company, intimate contact with many phases of the utility industry

Electrical advertising is perhaps 5 per cent of the first figure named, or $65,000,000 a year. At the very least consideration it should be $300,000,000 a year, of which $200,000,000 would be for electricity. The increase over the present income from this source would amount to over 10 per cent of the electric utilities' entire income at the present time.

A careful estimate of the possibilities in the immediate sale of signs and the material which goes into signs is $250,000,000 to provide electrical displays for all commercial institutions which are lacking them at the present time. This is certainly a conservative figure. I estimate that it would be at least $500,000,000, as there would be a great deal of business in replacing the inadequate displays on the premises that now have some display.

Convince the Architect

We in the electrical industry have not paid enough attention to convincing the architect of the values of electrical decoration and the possibilities. Electricity is here to say. It is already the greatest factor in human life. The proper blending of electric illumination with architecture is inevitable, and the architect who first realizes the possibilities and starts to utilize them in a large way will establish for himself a great eminence. The present-day life of the people results in great appreciative audiences for all kinds of outdoor night displays. The automobile and the amusements of the period result in a large percentage of the people being in the outdoor every evening to midnight or later, so that electrical displays and advertising will never go unadmired; but we should pay more attention to the artistic development of our equipment, so that they will make fine attractive day signs as well as night signs—not, as is too often the case now, merely unsightly structures.

Let me discuss the subject a little from the viewpoints, each, in turn, of those most interested in electrical advertising. First, let us consider the advertiser. He wants good circulation, as great as can be obtained through other mediums. He wants high, artistic merit, and I think we feel that we are lacking in this respect when we compare the appearance of what we have to offer with the beautiful things which are offered today by the printers' art, and even that of the billboard. He wants good service. It is one thing to see a great new display in its pristine beauty and quite another thing to care for it day in and day out so it will always operate regularly and look as well as when new. Many an advertiser has been driven to other mediums because of the unkempt appearance of unserviced signs.

The Advertising Agency

Consider next the advertising agency. We have not yet influenced it sufficiently so that it regularly includes a proportion of the advertising budgets of its clients for electrical advertising. The greatest pains should be taken to "sell" the agencies on the value and efficiency of our medium. They are entitled to their full, fair commissions, the same as they make when recommending other mediums, perhaps more at first, and we certainly cannot expect them to get very enthusiastic over our medium unless it pays them to do so. We know our medium is of sufficient value so that if properly developed and presented it will justify a price which will give us a good profit and give the agency a good commission.

From the point of view of the public: Perhaps the matter of first importance to them is the question of artistic effect—something which will enhance the appearance and attractiveness of its communities and not detract from it; and this must be a twenty-four hour matter. The public will become impressed with the value of this great service in considering the best interests of its communities, and particularly the best interests of their commercial institutions.

They Think They Are Interested

Let us turn now to the viewpoint of the central stations. They think they are interested, but unfortunately they do no realize what the possibilities are, as I have heretofore pointed out. The ordinary central station expends less than one per cent of its gross for advertising. The railroads spend 4 per cent of their passenger earnings, and various industries spend all the way up to 30 per cent of the chewing gum and patent medicine businesses. Five per cent is perhaps an average figure and would be quite justified for the electric utility, but supposing we fix it at 3 per cent. If so, at least one-half of this, or 1.5 per cent should be spent for electrical advertising. The utilities do not do enough of this, and I think they all realize it. But the great difficulty is in the present development of the art to know just what they want and convince themselves of what is available, and suitable and dignified.

As a personal illustration: I am perhaps more responsible than any other man because the company I represent does not do enough electrical advertising. But here is how these things work. We have had a committee working for six or eight months on designs for signs for our substations. After much discussion and the gradual reconciling of diverse views in the committee, the gentlemen agreed on a recommendation. I presume this means principally that they tired one another out. These sketches showing how the signs would look on the buildings were enlarged, and I have a pile, perhaps twenty of the, on my table. They have been there for two months.

A Matter Not Forced Is Put Aside

The real reason for the delay has been that when I looked them over they were not what I expected or would like to see. In fact, I was disappointed in them, and I hesitate to go ahead on these plans. The suggestions may be good—probably are—but before I am convinced of it, it will be necessary to arrange a meeting, probably a series of meetings, involving a good deal of time, to thoroughly get the minds of the group down to the proposition to give thoughtful consideration to it. This, as I say, takes a great deal of time, and in the busy days of a great business a matter which is not forcing itself upon you is put aside for other matters. I think this is what is happening all over this country, and it is one of the things which you gentlemen have to contend with in getting your companies to use more electrical advertising.

When we consider the viewpoint of the sign manufacturer, we see that he has serious problems. Because of some of the things we have been discussing, the cost of selling electric signs is extremely high—so high that practically no sign builders in the country have ever made any money. I will not go into the details of the tribulations in the matter of furnishing expensive sketches without end. Then, after the designer has gone to great expense, he may secure only a trifling percentage of the business solicited. It is a fact that a great high load factor revenue to the central stations is being impeded in its development because of the indifference of the public utilities in not being willing to stand part of the pioneering expense, and furthermore because of their not seeing the serious loss which they are sustaining by encouraging small competition.

Support the Manufacturers

It is a fine thing to patronize the small local sign builder. In many cases he is responsible for the interest in electric signs and he should have certain support and consideration, but if the central stations do not unite in supporting and building up three or four big national sign manufacturers, with resources sufficient for development, the sign business will languish.

Perhaps the greatest factor in the development of the electric utility business is the fact that great resourceful, centralized manufacturing companies have provided them with advanced apparatus and appliances. One reason why the gas companies of the country have not succeeded as the electric utilities have is because they have in that field no General Electric Company, no Westinghouse Company.

You would not go to the local blacksmith to have him make a turbine for you out of patriotism. You would not go to the local watchmaker to have him make a meter for you. That idea is preposterous; and yet in this field a large number of people are most concerned about the local man, and by supporting him they are retarding the development of the industry and interfering with developing a resourceful group of large manufacturers, who, to the extent that they have resources, will create a great development which will mean millions to the utilities.

I mentioned the architect a few minutes ago. He, too, must be educated until he fully appreciates what this great industry can do for him.

These are the principal thoughts I have in connection with the branch of the industry in which you are so much interested. Its possibilities are great. I think we have entered a new era and that we will see in the near future a very wonderful development which will be very satisfactory and profitable to all of us.

N. E. L. A. PUBLICATIONS

A list of current N. E. L. A. publications appears on Inside Cover pages of this issue of THE BULLETIN. A more complete list may be obtained on application to the Sales and Order Department, National Electric Light Association, 420 Lexington Avenue, New York, N. Y.

Progress of Development and Research

Relating to INDUCTIVE COORDINATION

By H. L. WILLS

MAN has always taken freely of everything that nature's vast storehouse contains just as soon as he has learned how to take and how to control those things or those forces; and, by application, reap the reward of a more secure, less laborious and a more pleasant life.

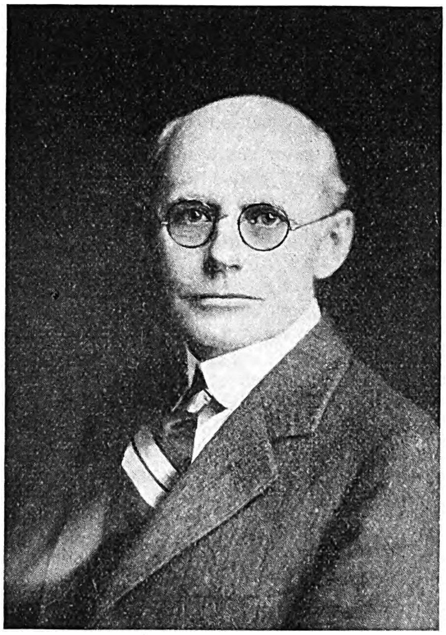
That one of nature's forces which we call electricity makes it possible for man to conserve his strength of body, secure greater peace of mind and more bodily comforts than was possible before this phenomenon was brought into effective activity, and in some degree controlled.

Today there is widespread knowledge of some of the most apparent of the laws of this phenomenon, and as a result of this knowledge we have put this force to work to lighten the labor of the human family and bring into neighborly touch its members, even those at the far ends of the earth.

Almost as a matter of course the first and most obvious use of electricity was one that required that small amount of power that was well within our ability to provide and at costs that were not excessive. Its application as used in telegraphy provided a facility that was wonderfully useful; its use spread rapidly, and as transmission distances increased, inventive genius found ways and means to carry on this work without having to go to materially higher power levels, raised greatly the speed of operation and multiplied the concurrent use of each transmission conductor many times; all of which, directly and indirectly, was of very material benefit to the business world and to society in general.

Free Development in Early Stages

During the formative stages of this industry, no other uses of electricity made it necessary to consider anything but the problem at hand—in other words, the development was carried forward with the utmost freedom, circuits were the most simple and the design of instruments was almost casual. The growth of the industry brought consolidations of the separate enterprises and consolidations brought standardization for both transmission line construction and instrument design and characteristics; thus, the early practices in the art formed the background which has affected the advances of later years.



Mr. Wills is Chairman of the Inductive Coordination Committee, N. E. L. A., and an authority on problems of inductive interference and coordination, but even more important is the fact that his friends always call him "Dad." He is one of the industry's old-timers, and is now Assistant to the Vice-President and General Manager of the Georgia Power Company.

The telephone started on the same primitive basis and was practically unhampered, but it was soon discovered that for successful transmission of voice currents a fundamentally different treatment of the transmission line question than that established for the telegraph was required, and meeting this requirement increased the costs of the transmission circuit. Here again inventive genius expanded the burden imposed on each transmission circuit without having to go to materially higher power levels.

When electric lighting and power systems began operation in the cities or towns, the amount of power and the voltage that was required was relatively small, the circuits were the most primitive, and the appartus was more or less crude, but as demand for this service grew, changes in generating apparatus and circuit design were necessary to provide the power required to fill the demand. Voltages of transmission and distribution systems have increased steadily.

Each of these systems developed in its own peculiar way, largely independent of any restriction that one use of electricity might impose on any other use.

Each developed in a perfectly logical direction.

Each has contributed in very large measure to the material and physical welfare of a great body of people.

Each Type of Service Indispensable

Each has become so interwoven in our social, business and industrial life that they are indispensable.

Considering what has been said of the development of the telegraph, telephone, and electric power systems as a background for our picture of the present-day situation, and considering further the fact that telegraph and telephone systems as a class have been developed along lines of greater circuit utilization without having to go to materially higher power levels, that the electric power systems have been called upon to deliver larger and larger amounts of power, that the transmission and distribution lines of all these systems occupy the same streets, highways, and in other situations where these lines are placed in relatively close proximity, it is only a natural consequence that those lines transmitting the larger amounts of power would have a decided influence on those lines which function with an exceedingly small amount of power.

Only the fact that the necessity for coordination was realized and preventive and mitigative measures applied to all of these systems, has made it possible for the systems concerned to meet the needs of their patrons.

In the ordinary walks of life, if one person interferes with another in the conduct of his business or his social life, there have been established certain codes which are interpreted under the rules of law by the courts, and thus are determined the duties of each party; whereas, when the operation of one electrical circuit interferes with the operation of another electrical circuit. commonly accepted codes are lacking which clearly define an equitable assignment of duty to each party operating these circuits.

Cooperation between the National Electric Light Association and the Bell Telephone System has brought about a mutually acceptable code of principles that stands as a basis upon which adjustments of problems arising through inductive interference can be effected. A few practices have already been agreed upon. These practices, however, do not contain quantitative values which are important to their direct application in the field.

The Immediate Problem

Our problem now is to expand these practices to cover all our needs, and to do this we must know the extreme limits to which coordination measures can be carried out in both systems. Then we must determine how far these measures may be carried in either or both systems, and not unnecessarily restrain advancement in the arts, or bar the further expansion of the services by reason of prohibitive costs.

We have organized a Joint Development and Research Subcommittee, and to this Committee is assigned the task of securing the necessary data which will make it possible to complete the code of practices so that they may be applied more directly as working tools to the everyday field problems of inductive coordination.

This Joint Development and Research Subcommittee has undertaken to collect the necessary data to answer the questions involved, through the establishment of eleven so-called Project Subcommittees. For convenience of reference these Subcommittees have been arbitrarily numbered from one to eleven inclusive.

Specialized Investigations

To Project Subcommittee Number One has been assigned the task of securing data on the following subjects:

1. Unbalance of telephone circuits—line and apparatus—magnitudes and relative importance of different types—methods of location and measurement.
2. Longitudinal propagation of induced voltages and currents.—This refers to the propagation along circuits composed of the wires of a line as one side and ground as the other, and is of importance in determining the effect of unbalance and the relation of effects at exposure and at circuit terminals.
3. Shielding—mutual reactions of a plurality of telephone circuits—relation between effects on a single circuit and effects on the same circuit among a group of other circuits on the same line—relation of induced voltages and voltages or currents produced under operating conditions.
4. Relation of effects measured at ends of isolated exposures and at circuit terminals.
5. Cumulative effect of successive exposures. Law of combination.
6. Efficacy of coordinated transpositions—calculation and measurement of coefficients of induction—design and installation of coordinated transpositions in power and telephone circuits—calculation and measurement of coefficients of induction after transposing.

Some data has been secured on this project through a series of tests made on a group of circuits located near Cincinnati, Ohio.

At a location near Terre Haute, Ind., was found another situation where a large amount of data on these subjects could be secured, and the last two years have been devoted to intensive work at this point.

Other situations must be secured that will provide an opportunity to check all of this data under conditions that are so decidedly different from the original situations that we can be sure that the whole field is properly reviewed.

Project Subcommittee Number Two has for its assignment the following:

An investigation of telephone protective methods and apparatus to determine the practicability of their improvement from the standpoint of inductive interference and physical hazard.

What may be expected from this study should be about as follows:

1. Clear understanding of the features of the telephone and power systems which effect the protection of the telephone system.
2. Data on the operation and performance of present protective devices.
3. Information as to the importance of telephone protection in respect to inductive and safety coordination.
4. Conclusion as to the possibilities of developing improved methods and devices from the standpoint of inductive coordination.
5. Conclusion as to the possibilities of developing improved methods and equipment from the standpoint of safety coordination.

A large amount of data has been secured by the Project Subcommittee from tests carried on in the Bell Telephone Laboratories, the Schenectady or Lynn works of the General Electric Company, the Westinghouse Electric and Manufacturing Company's works, and from many other situations where opportunity favored. However, there is still more to be accomplished before worth while conclusions may be drawn from the mass of data thus far secured.

Project Subcommittee Number Three undertakes the following schedules:

Make a comprehensive investigation of the magnitude and distribution of power system residuals, transient and steady state including the controlling factors and methods for limiting the magnitude of the residuals and their inductive effects, with particular reference to different methods of grounding neutrals. To carry out the project, extensive tests will have to be made on long transmission lines where conditions with respect to transpositions and grounding can be varied and controlled. Certain characteristics of transformers and machines will have to be studied in the shops and laboratories of the manufacturing companies.

What we may expect from this study is along the following lines:

The completion of this project will yield authentic quantitative data on the effects from the standpoint of residuals of various conditions of operation in power systems under different circumstances, such as capacity of system, size and type of network and protective methods employed. The efficiency and practicability of different methods of control of residuals, a matter of great importance in problems of inductive coordination, will be determined.

Many investigations have been made on power systems located in different parts of the country, but additional tests must be carried on on a number of systems that present varied characteristics, the reason for this being obvious.

A Difficult Problem to Analyze

Project Subcommittee Number Four has a most difficult problem to analyze:

The object of this project is to determine the effect on speech reception of noise generated in telephone receivers by external causes. Such a study is necessary in order that efforts to reduce noise may be guided by adequate knowledge of the problem. An important part of this investigation is the study and further development of methods of measuring noise and a survey of the existing conditions in respect to noise on telephone circuits.

Much study has been directed along these lines, and a large amount of data secured from numerous sources and considerable progress has been made.

Measuring the Unwanted Currents in the Power System

For Project Subcommittee Number Five:

> The objects of this investigation are to determine whether there are practical improvements in wave shape which can be made and what steps would be required to secure such improvements; and to develop means and methods for rating wave shapes in respect to their relative effects from an interference standpoint. This investigation will include the collection of data regarding wave shapes of rotating machines of different sizes, classes, and designs, under different conditions of load and excitation, and regarding wave shapes of operating systems. It will also include an economic study involving a comparison of the relative advantages obtainable by different methods of improving wave shape in relation to corresponding benefits obtained.

Important data on this subject has been, and is being, secured from many sources.

The work of Project Subcommittee Number Six is devoted to the study of joint use of poles which will include a determination of the coefficients of induction under conditions of joint use, studies of induction with types of telephone and power circuits commonly involved in joint use, and studies of transpositions and other means of minimizing interference.

A situation where there was joint use of poles between distribution, power and lighting circuits, and telephone circuits in cable, was made available for the use of this Subcommittee. The location was Minneapolis, Minn. The system of the local power and telephone companies was used by this Subcommittee and they secured a very large amount of valuable data which has been incorporated in a progress report. A limited number of copies of this report have been published.

Interference with Carrier Current Communication Channels

Joint pole use between power circuits and open wire telephone circuits is now under study at a location near Elmira, N. Y., and will probably be concluded within the next six months. The time involved on these two investigations has been something over four years and most of this time was devoted to the actual work of securing accurate data.

The most active of the remaining Project Subcommittees is Number Nine which has to do with interference with carrier current communication channels. This subcommittee has carried out studies which have provided data that is of use not only in connection with its own problem, but is of importance to many of the other Project Subcommittees.

The scope of this Subcommittee's work can be stated as follows:

Some interference has been experienced with carrier telephone circuits. The art of carrier current transmission is relatively new, but is rapidly expanding, and this investigation is undertaken in order that means may be available for properly dealing with such situations before they have grown too widespread and serious. An important phase of this investigation is the study of interference between carrier systems on power circuits and carrier systems on commercial telephone lines.

The information that this work may be expected to develop is shown herewith:

> 1. Determination of all sources of carrier frequency interference from power systems, including carrier systems superimposed on power lines and their general importance.
> 2. Sufficient information regarding coefficients of induction at carrier frequencies (as compared to coefficients at lower frequencies) for purposes of practical estimates of interference in cases of exposure.
> 3. Determination of importance of telephone line and apparatus unbalances at carrier frequencies under known conditions of induction.
> 4. Sufficient information regarding carrier frequency transmission and attenuation characteristics of power lines and apparatus for purposes of practical estimates of inducing quantities at an exposure in terms of their magnitudes at another point (including at this point, the output terminals of high frequency generating apparatus in the case of power line carrier systems).
> 5. Sufficient information regarding longitudinal propagation of carrier frequencies in telephone circuits for purposes of practical estimates of induced effects at terminals or other points at which unbalances exist.

So far most of the work of this Subcommittee has been carried out in the Northern part of New York State. Work is also being carried on in the Southern part of New Jersey, where facilities are provided which will permit full time prosecution of the work so long as this or other Projects need to use the facilities built and provided for at this point.

Project Subcommittee Number Seven deals with the question of power level and sensitivity of telephone circuits. Knowledge of this subject is quite important on considering problems of coordination. The mission of this Subcommittee may be expressed in the following paragraph:

> The ratio of extraneous power to the power used for speech transmission is a factor of direct significance in determining the interfering effect of induction in a telephone circuit. The practicability of preventing interference by raising the power level of telephone circuits is to be considered in this Project for both local and toll circuits.

Several reports have been made by this Subcommittee and some technical information has been secured.

Project Subcommittee Number Eight deals with the question of selective devices. This project provides for a study of the use of such devices as resonant shunts and filters for the suppression of voltages and currents of particular frequencies. Such devices are theoretically applicable to both power circuits and communication circuits. This Subcommittee faces a rather difficult task; and, while a large amount of work has been put on this subject, the results can hardly be stated in a paper of this kind. However, considerable progress is being made that is of real value.

Can the Transmitters and Receivers Be Modified?

Project Subcommittee Number Ten deals with the question of telephone receivers and transmitters. This includes a study of the relation of the frequency response characteristics (sensitivity and efficiency) of telephone receivers and transmitters to noise interference and acoustic shock.

Project subcommittee Number Eleven is devoting its attention to a study of special devices and methods. They will consider such subjects as drainage connections, neutralizing transformers, shielding systems, booster transformers, and sectionalizing transformers. Some of these methods apply to power systems, others to telephone systems, and a few of them apply to both.

This review of the work that has been placed in the hands of the Joint Development and Research Subcommittee should bring to mind quite forcibly the difficult work required to determine the nature and content of a code of practices that will be acceptable to all of the interested parties concerned.

Amplifier Takes a Look at Agriculture

By AMPLIFIER

I SUPPOSE that about seven men out of every ten reach a period in their lives when they feel a great urge to visit some farm they have known in their childhood. In some cases it is a farm on which they were born and spent their boyhood days getting up at daylight and helping with the chores, trudging to school in the winter or going fishing and swimming in the summer, winding up the day by again helping with the chores and reading by an oil lamp in the evening. In others it may be the farm of one's grandfather, known only as a great place to go to in the summer with a cool pantry where one could always find a piece of fresh pie or a big jar full of cookies. In still others it may have been a farm taking "paying guests" where one's father, being in moderate circumstances, could secure a pleasant vacation for the whole family without too severe a strain on his pocketbook.

TO those of us who have reached a comfortable and reminiscent post-middle age there always remain certain very definite impressions of this farm. There was the Saturday night bath in a wooden or tin tub by the kitchen fire, with hot water from a tea kettle and cold water from a pail. There were the oil lamps in the kitchen and dining room, with candles when bed time came and an old fashioned lantern if one had to make an excursion out of doors after dark. The laborious weekly butter making with a hand churn was always an event because of the fresh buttermilk—a product of the farm little known to the present generation. The feeding of the chickens, pigs, horses and cattle were the chores if the boy lived there and exciting incidents if simply a visitor. The same was true of gathering eggs, or honey, or apples, or vegetables from the kitchen garden. Chopping the day's supply of wood was manual labor in the one case and a delightful privilege in the other.

The writer had one of these urges during the holidays. In this case the farm was one which originally belonged to my grandfather and was subsequently occupied by an uncle who in turn was succeeded by a cousin. I never could understand why this cousin stayed on the farm—to me it was the farm of my boyhood days. I had not seen it, nor him, for many, many years but I knew from occasional letters that he must be fairly well-to-do. I knew that he had a telephone, a radio, an automobile which was considerably more than a flivver and I knew that he made frequent trips to the city. But the farm, to me, was still the farm of many years ago when a trip to the city meant an all day ride behind a team of horses.

THE USEFUL PLOUGH

An Old Song that needs a slight revision.

A country life is sweet!
In moderate cold and heat,
To walk in the air, how pleasant and fair,
In every field of wheat,
The fairest of flowers adorning the bowers,
And every meadow's brow;
So that I say, no courtier may
Compare with them who clothe in grey,
And follow the useful plough.

They rise with the morning lark,
And labour 'til almost dark;
Then folding their sheep, they hasten to sleep;
While every pleasant park
Next morning is ringing with birds that are singing,
On each green, tender bough,
With what content and merriment
Their days are spent, whose minds are bent,
To follow the useful plough.

So, having nothing better to do, I decided to take a look at the Middle West (about which some of the middle western power companies do so much talking) and pay him a brief visit. I planned the trip with the idea that I would arrive at the farm early in the morning and leave the same evening—I had no desire to go to bed by candle light in an unheated bedroom or to get up at daylight for breakfast because the chores had to be done. I stayed a week.

Arriving at what I had remembered as a country village, I found a thriving town, the main street of which looked almost like a miniature Broadway, with its electric signs, two moving picture houses and illuminated store windows. In twenty minutes I was at my cousin's house—a trip which took over two hours in the old days. But what a house!

THE old house had been torn down these many years and a new one built across the road. Hot water heat by means of an electrically controlled oil heater in the basement. A reading room, dining room, locker room and showers with hot and cold water—all in the basement—for the "help." Electric lights—not the single unshaded electric bulb suspended from the ceiling with a cord which most people associate with electric lights on the farm, but floor lamps everywhere, with reading lights in the bedrooms.

Gone were the tin or wooden tub and the outside hand pump, their places being taken by two bath rooms with running water. In the kitchen was an electric range. In a large room adjacent to the kitchen I saw an electric washing machine, an electric iron, a vacuum cleaner, and an electric refrigerator. In fact my cousin's house was as completely equipped and as up-to-date as any city house I had ever been in. Housekeeping was as simple as in a modern New York apartment.

The outside of the house was quite as interesting as the inside. Running water in the barns and all other outbuildings. The milking was done with electric milking machines while feed was ground with the help of an electric motor. The chicken plant was lighted with electric lights turned on and off by an automatic clock. There were practically no chores, for almost everything was done by electricity.

"How come?" I asked.

"WELL of course," he answered, "I didn't get everything at once. As you know I graduated from an agricultural college and I have always had an idea that scientific farming would pay quite as well as running a drug store, or making automobiles or following a profession. When father died he left a little money and I was faced with the choice of proving my ideas or selling the farm and going into business. I decided to practice what I had been preaching.

"I knew I ought to have electricity for both power and lights and here I ran into the first problem. The nearest power company is about six miles away. The gang running it are progressive and have spent a lot of time and money on what they call rural electrification. Their lines extend in many directions beyond the limits of the town and they have a rural service department with a small staff of men who know about farming and who also know how electricity can be employed efficiently and economically on the farm. I called on this outfit and after I had explained what I wanted they promised to investigate.

"But when they investigated they found that I was located in the opposite direction from the town from the high tension line that brought the current from an extensive interconnected system. Service had only been carried about three miles in my direction and the people living beyond that, with the exception of myself, did not want electricity. They are an old fashioned lot who seem to feel that the ways of their grandfathers are quite good enough for them and, according to my standards, are altogether shiftless. This meant a gap of three miles between the nearest available current and my house.

"Now it costs approximately $1,000 a mile to extend a farm power line in some localities and in others the initial cost is much higher. With all the other expenditures which I was planning and the cost of new equipment I did not feel I could build the line myself. What was the company going to do about it?

"AFTER a number of conferences we decided to survey the territory in another direction. At an angle of about 45 deg. there is another power line of the same company with an intervening gap of slightly more than three miles. But my neighbors in this direction are more progressive and it took very little effort on the part of the company and myself to sell them the idea that they ought to have electric service. As a result a line was eventually run along this route.

"Now, you see," he went on, "I have one of the 350,000 electrified farms in the United States. Like most other farmers I wasn't able to acquire at once all of the equipment which you have seen. In fact it has taken me three or four years. Implement dealers, as well as the power companies, often assist in the purchasing of equipment and appliances for the house and barns but these things all have to be paid for eventually and no farmer, no matter how sure he may be of his ultimate success as a scientific farmer, wants to shoulder too great a financial burden."

"I suppose there are a lot of problems connected with this idea of farm electrification," I said, because it was time for me to say something and I knew less than nothing about the subject.

"Indeed there are," he replied, feelingly. "There are attitudes of mind and prejudice in this whole farm electrification business as well as money and energy and vision and sentiment. It is one thing for a farmer like myself to want electricity on his place and quite another thing when the power company is called upon to solve the problems involved in undertaking to provide current. As nearly as I can make out, the light and power industry must have spent hundreds of thousands and, perhaps, even millions of dollars on these problems.

"What are these problems you talk so much about," I asked.

"Well, in the first place," he replied, "there is the problem of capital investment. How to get the current to the farmer with an investment sufficiently reasonable that it will earn a fair return eventually. About the only thing the farmer thinks about when he first considers electricity is electric lights, and the second is running water. The amount of current which he will consume for these purposes is mighty little. In order to give him these two conveniences the light and power company will have to invest ten or more times as much as they have to invest to give service to a city customer.

"So the company is faced not only with the problem of the number of customers it can get to the mile of line (which it knows must be small) but with the problem of educating the farmer as to how he can use electricity for all sorts of purposes profitably. A rural power line must earn money just as an industrial power line must earn money if it is to continue to exist. Dollars demand wages just as my hired men demand wages, and the problem of the wages of the dollar working for rural electrification is a serious one.

"Second, there is the problem of stability of service. The farmer, depending on electrical power to do the work of his farm, is in a mighty bad fix if there is a constant interruption of service and he is constantly forced to return, even temporarily, to man power to do the work. Once equipped electrically there is no merit in equipment that depends on manual labor. Of course this problem is being solved by interconnection. In many sections of the country the rural districts as well as the small towns and villages are receiving the same 24-hour metropolitan service as the big cities and this is all due to the fact that the isolated plant is disappearing and its place being taken by the great interconnected system serving areas that cover not only whole states but, in several instances, two or more states.

"THIRD, there is always the problem of the farmer's financial condition. Many farmers who today are prosperous because of electrification combined with scientific methods of farming were as good as bankrupt a few years ago. In order to turn them into profitable customers the light and power company may have acted as banker in the purchase of equipment. This is simply another phase of the financial problem which sometimes may be expensive but which, as I understand it, cannot be reflected in the rates."

"Well," I said, "for a chap born on the farm you seem to have learned a lot about something that I never heard of. Have you anything more in your bag of tricks?"

He laughed. "Oh, yes. I am going to take you tomorrow or next day to a place a few miles from here occupied by an old German couple who are friends of mine. You will find it mighty interesting."

And so I did. This couple had wanted to get away from a congested city and factory work. They had acquired about 15 acres of relatively inexpensive land and took to it some of the things they had seen and learned in factories. The result is what I would call an industrial chicken ranch.

They have about 1100 fine Leghorn chickens, housed in shed-type poultry houses designed by experts from the state capital. Each house is a unit, holding from 100 to 150 hens. These units are identical and are systematized like a factory. They are arranged for "straight line production" with conveyors and give a maximum output with a minimum of human labor.

The nests are what my cousin told me is the modern "trap" type, hinged to the wall so that the litter can be dumped by a single lifting operation. A canvas belt conveyor runs the entire length of the house (replacing the old style dropping boards) and is cleaned by the starting of the electric motor. The manure is dumped into a cart at one end of the row of houses and conveyed directly to a pit. The same conveyor is used for removing the litter from the floor of the houses with a minimum of dust, dirt and effort.

Of course, the houses are electrically lighted. These lights are turned on automatically by a time switch so that the chickens are eating and laying while our German chicken farmer and his wife are still sleeping. He told me that the increased egg production from the use of electric lights paid, in one single month, for the cost of the line extension and the wiring of his house and out buildings. Incidentally he also told me that the water is electrically heated during freezing weather for about the price of one egg a day.

This farmer feeds a scientific mixture of grain, meat scraps and vitamin food. He buys whole grain from the elevator, the mill, or a neighboring farmer; whichever is cheaper. The grain is raised to a second story in his granary in a grain elevator. It is fed into a hopper made from an ordinary vinegar barrel. From the barrel it goes by gravity through a chute made from an old barn ventilator, into a hammer type grinding mill, driven by a five horsepower electric motor. It is ground rapidly to any fineness he wishes, without further attention or care. It goes from the grinder into a bin beneath the mill. From there it is weighed out into proper proportions, dumped into a motor driven mixer, with the correct balance of other food and is thoroughly mixed and sacked. All of this in less time than he formerly spent traveling back and forth to town having his grain ground and waiting at the mill. The cost of doing these operations is less than he paid for grinding. In fact he figures that his saving on feed will pay for the installation within one year.

The 250 gallons of water a day, necessary for the chickens, are pumped by a motor driven pressure type of water system directly into the hen house.

This old German and his wife seem to me to be nothing more or less than industrialized chicken farmers. They are using their brains and putting electricity to work; making it earn money for them. It is production at a minimum cost. With it their house is equipped with all of the comforts of the city home. They are prosperous and contented and must be good customers for the company that serves them.

Now I am back in New York thinking about these things. I think of my grandmother, a household drudge all her life. I think of my grandfather, a hard-working, round-shouldered man, old, years before his time. What would they think if they could see their grandson's farm—the same land and the same products—but no longer a farm as it was understood in the old days. It's a great old world and we who live in the city perhaps are not so smart as we think we are.

The Philanthropy of Tree Clearance Programs

By G. M. CODDING*

TO the public utility company a program of line clearance means a decided lessening of service interference from tree growth. To the tree expert company it means an opportunity to bring to bear on a practical public problem the scientific knowledge, experimentation and results of actual work for private clients who demand a certain high type of work.

To the public, what should this program of line clearance signify? Not alone the desire of the utility to prevent any needless handicapping of distribution, this is the *prima facie* significance—beyond, and as important, is the tremendous philanthropic contribution of the utility toward civic betterment. In an age of mechanical and material improvement, the public utilities companies in their line clearance programs have accomplished, along with the elimination of a great percentage of service interference, the following:

1. An æsthetic improvement to street trees by pruning and shaping.
2. The elimination of tree disease breeding places by the removal of dead and diseased growth.
3. The lessening of danger hazards to pedestrians by the removal of dangerous limb growth.
4. The elimination of unsightly "looping off" of trees (the once prevalent method of securing clearance).
5. A decided result in building up, through example, a community pride in the possession and consideration of shade tree growth.

Horticultural statisticians have compiled the actual value of a shade tree in dollars and cents. Real estate experts know the value of shade trees to a home; landscape architects have their firm belief in the effect which shade trees have on the appearance of a community; sociologists and child phychologists have demonstrated the effect which shade trees have in the character-molding of individuals. The city without shade trees is the city without the dignity and home-like security of those communities which are known and identified by their arching elms, symmetrical maples, stately poplars or sturdy oaks. The health of a community is vitally affected by shade tree growth: leaves are continually, through transpiration and chemical processes, sending moisture particles into the air we breathe, they are absorbing, through the stomata of their leaf tissues, noxious and harmful gases, their growth is breaking up the severe heat of a summer sun, giving cooling and refreshing shade.

It is worth while and commendable, this little-noticed philanthropic contribution of the utility. The method of treatment of one of our greatest natural resources, the shade tree, by the utility is proof to us, who may be a trifle emphatic in our desire to perpetuate shade tree growth, that there are yet great material organizations which are not inclined toward the fallacious opinions rampant today that progress is a thing to be measured in material gain.

Dr. E. P. Felt, Director of the Bartlett Tree Research Laboratories in Stamford, Conn., estimates the trees for which the town of Greenwich, Conn., is celebrated, as "not less than one-fourth of the town's assessed valuation," which would put the figure at approximately $25,000,000! Such a valuation, made after a careful study by one of the leading authorities on shade tree insects, would seem to indicate that the public utilities companies are handling the shade trees, by which their product must be affected, in a manner befitting a tremendous civic asset.

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*In charge of Public Utility operations for the F. A. Bartlett Tree Expert Company.

Some General Electric Company Developments of 1928

By JOHN LISTON

THE year 1928 exceeded all previous years in its volume of production of electrical equipment. Advances in design and improved materials resulted in increased efficiencies in practically every phrase of the industry from the generation, transformation, and distribution of electric energy to its application and control.

A 94,000-kw. tandem compound unit (Fig. 1), the largest completed unit of its type, was placed in service, and work was nearing completion on a 160,000-kw. tandem compound and a 208,000-kw. cross-compound unit, each representing the maximum capacity in its type.

Concurrently with the increase in the mileage of our lighted airways, the lighting units for both route and landing field service were standardized, and more powerful beacons and floodlights were provided to increase the factor of safety in landing at airports.

The outstanding accomplishments in research include the use of the lightning-actuated type of cathode-ray oscillograph, which was applied in the study of lightning phenomena in the field on a truly engineering basis, the production of a 50,000,000-cycle tube with a ten-kilowatt output, and photoelectric tubes of greatly increased sensitivity, which have aided in the notable advances made toward the achievement of practical television. The use of vacuum tubes for purposes other than radio communication was extended to such diverse applications as the control of furnace temperature, the automatic leveling of elevators, and the remote indication, control, and supervision of the equipment of power stations and substations.

The automatic control of generating equipment was applied to a hydro-electric station of 100,000-kv-a. capacity; and the mercury-arc power rectifier was improved in both capacity and performance and utilized in automatic substations to a greater extent than in previous years. A feature of great potential value was the development of a practical and simplified form of outdoor substation for farm service, which enables the farmer to receive current at normal operating voltages directly from high-tension transmission lines. Series capacitors were utilized, for the first time on a commercial basis, for compensating the reactance on a transmission line.

Turbines

The year was notable for the advent of the first two all-high-pressure stations equipped exclusively with 1400-lb. boilers and large 1200-lb. turbines.

A thorough study had been made of the dollar economy of various steam pressures and cycles of operation, and as a result the turbines will have steam conditions of 1200 lb., 725 deg. total temperature with boiler reheat to 750 deg. between the high and low pres-

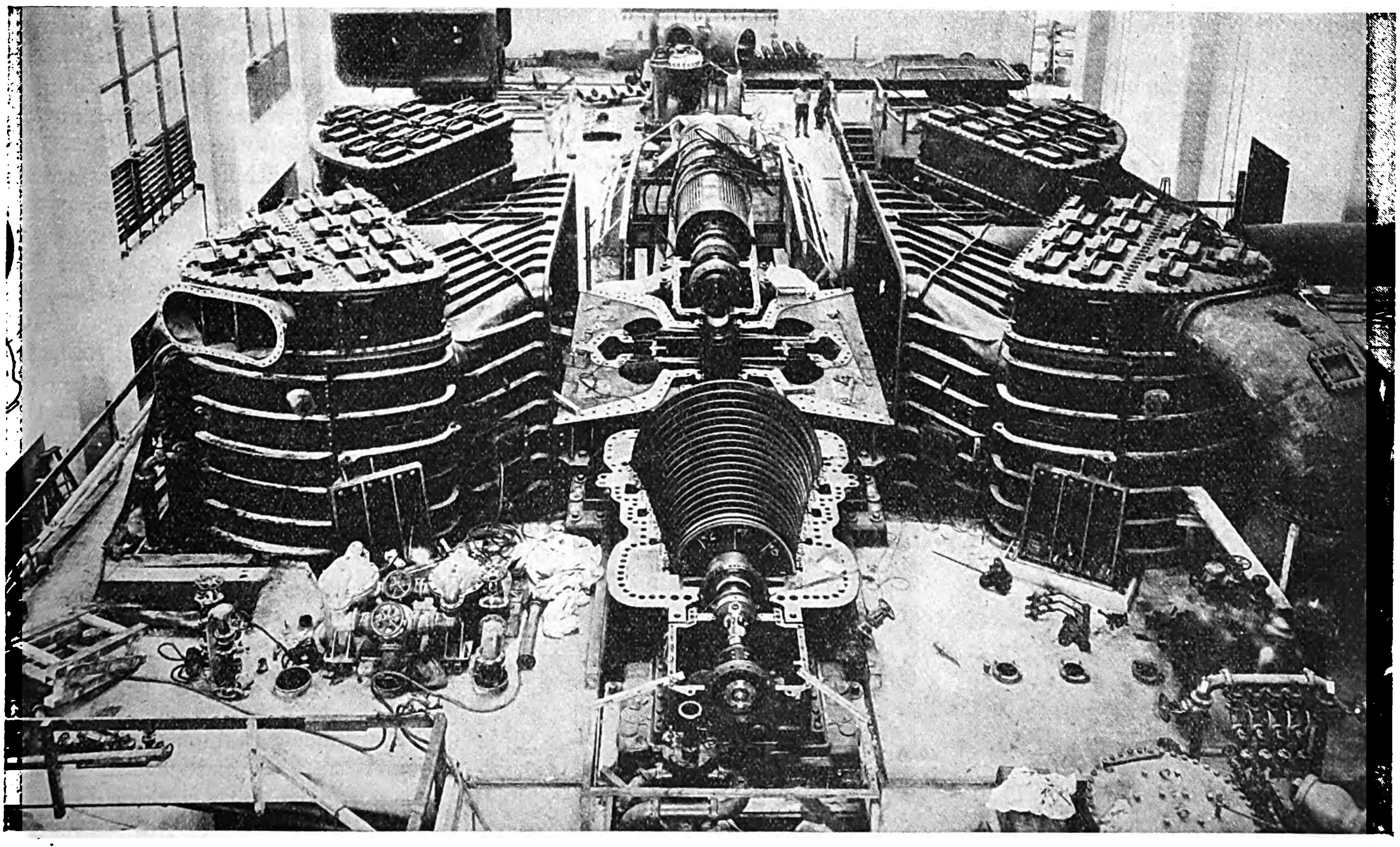

Fig. 1—94,000 kw. turbine generator set partly installed in The Long Beach Station of The Southern California Edison Co.

sure elements of the cross-compound turbines. Economy data from ten representative high-pressure and high-temperature power plants have shown a practical realization of the theoretical gains resulting from higher steam pressures and temperatures (Fig. 2).

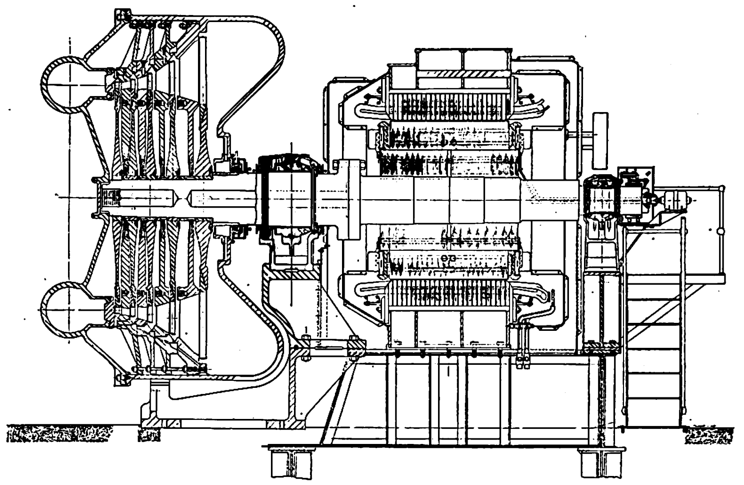

Fig. 3—Cross section of 10,000 kw. Mercury turbine and generator

Emmet Mercury Vapor Process

The mercury vapor power plant equipment (Fig. 3) installed in the South Meadow Station at Hartford (Conn.), was put into commercial service during October, 1928, and operated in the most satisfactory manner.

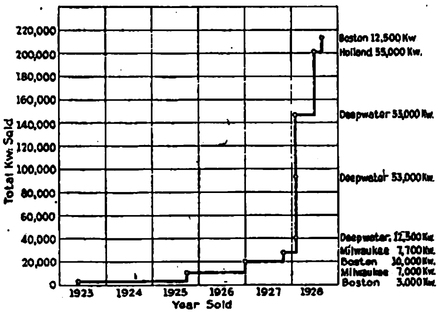

Fig. 2—Growth in the use of 1200 lb. steam pressure with G. E. turbines

The first runs made have indicated the desirability of certain modifications that will require some few weeks, and meanwhile it should be appreciated that no fundamental changes are involved, but merely minor adjustments. The data taken from the log sheets were highly gratifying.

Table I gives data on the designed conditions of the equipment.

TABLE I

Output of mercury turbine	10,000	kw.
Speed of mercury turbine	720	r.p.m.
Steam produced per hour	125,000	lb.
Steam pressure	350	lb. gauge
Steam temperature......	700	deg. F.
Mercury vaporized per hour	1,150,000	lb.
Temperature mercury vapor	884	deg. F.
Pressure vapor at mercury turbine..........	70	lb. gauge
Vacuum in mercury condenser	28	in.
Temperature mercury exhaust	458	deg. F.
Gas temp. beyond mercury liquid heater.....	950	deg. F.
Gas temp. beyond steam superheater	650	deg. F.
Gas temp. beyond water economizer	480	deg. F.
Gas temp. to stack......	280	deg. F.
Air temp. entering furnace	390	deg. F.
Coal burned per hour....	14,500	lb.
Heat in coal per pound..	14,500	B.t.u.

Motors

An improved single-phase repulsion-induction motor, in sizes ranging from ¾ to 2 hp. at 1800 r.p.m., is of the constant-speed high-starting-torque type for general application.

Rapid development in the art of designing capacitors has made this product so reliable that there has again arisen a demand for single-phase motors utilizing essentially squirrel-cage induction rotors wound like those of two-phase machines but with a capacitor across one phase to afford proper starting torque. Such motors were produced in sizes from 1-6 to 15 hp.

Some two-speed synchronous motors rated 50/25 hp. 257/128 r.p.m. were constructed for driving ammonia compressors. They are the first motors of this type to be used for this service.

During the year the line of synchronous motors having induction-motor characteristics, making them suitable for general purpose application, was extended to sizes as large as 500 hp. at speeds of 1200 to 600 r.p.m. These motors utilize a skeleton-frame construction and are equipped with a compact direct-connected exciter.

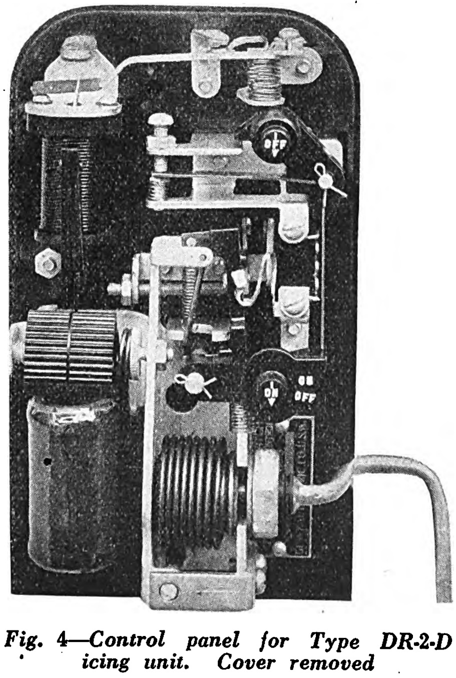

Fig. 4—Control panel for Type DR-2-D icing unit. Cover removed

Electric Refrigeration

There were no fundamental changes in the design of the household type of refrigerating machine although some minor modifications were incorporated to improve efficiency. One of these was the introduction of an oil conditioner which maintains the oil bath at a temperature which prevents condensation of the refrigerant in the base, thereby maintaining the oil in a state which gives the best possible lubrication.

In order to provide for conditions where space in the household is restricted, a machine was devised in which the compressor unit was modified and mounted with minor alterations on a smaller box top and assembled in a cabinet of 3½-cu. ft. of food-storage capacity.

The control (Fig. 4) was improved by a device which compensates the overload trip for room temperature and by an attachment which allows the adjustment of the temperature of the food-storage compartment to be made from the outside of the panel.

A new cabinet was also devised which consists of an outer shell of essentially one piece, insulated from an essentially one-piece interior with a new type of insulating material. No wood is used in its construction; a special condensate material being used around the door and door opening to join the inner lining to the outer shell. Metal hooks for supporting the food shelves were eliminated.

Transformers

The growing demand for the load-ratio control type of transformer is indicated by the fact that about 25 per cent by kv-a. of all power transformers and nearly 40 per cent by kv-a. of all transformers above 20,000 kv-a. are now provided with load-ratio control. Over 2,000,000 kv-a. of G-E transformers so equipped are now in service.

All schemes of load-ratio control involve sufficient reactance to limit the current flow when passing from one tap to another. A separate reactor may be used or the reactance may be inherent in the transformer.

The efficiencies of modern transformers are so high that new records are rarely made. During the year, however, two 20,000-kv-a. units attained a full-load efficiency of 99.52 per cent. (Fig. 5).

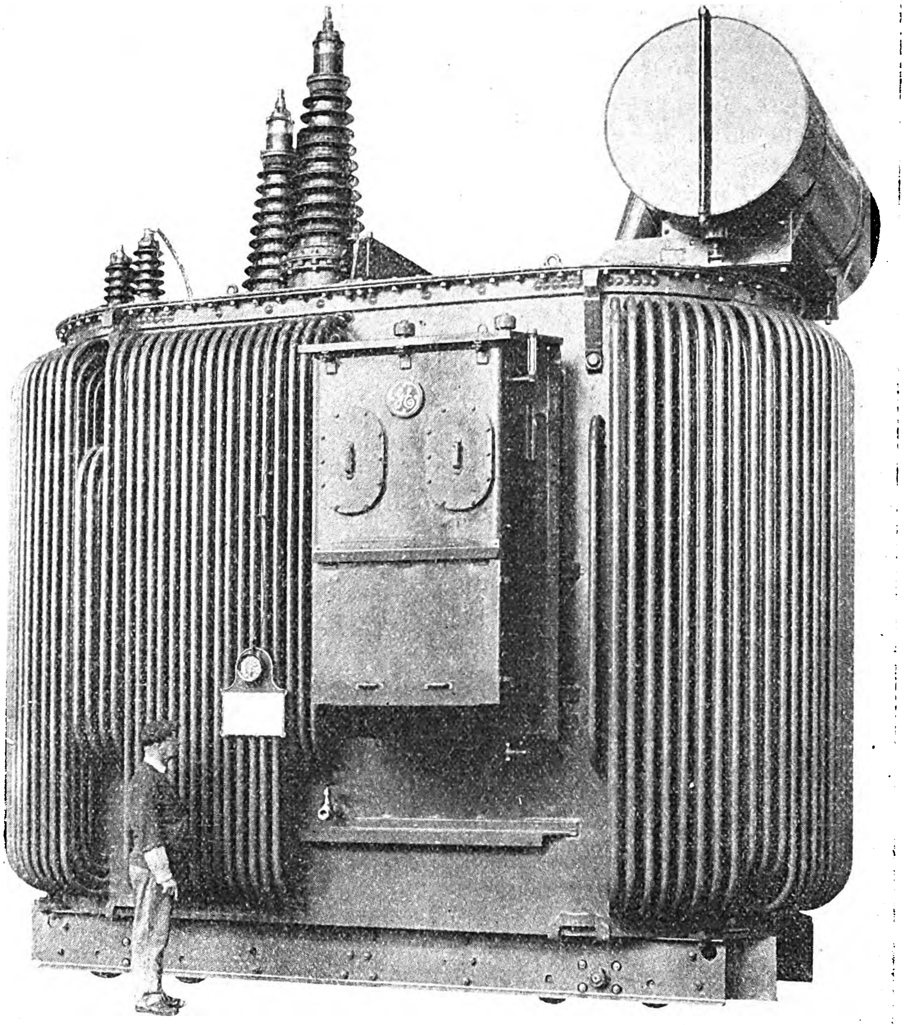

Fig. 5—Type H-60-20833—120000Y (G. R.) 120000Y (G. R.) DH-outdoor transformer for Detroit Edison Co., Detroit, Mich. Reg. Mch. 36394 *P. O.* 213903. *Load-ratio control side*

Farm-Power Substations

A small transformer stepdown substation was developed to permit power companies to take power safely and economically from high-voltage lines to supply the farm and the small rural community.

The cost of reaching and serving scattered rural loads is prohibitive in many cases as long low-voltage distribution lines run into relatively large capital investments that are not justified by the returns secured. To tap high-voltage trunk lines (66,000 or 110,000-volt) has heretofore involved expensive oil circuit breaker and lightning arrester equipment.

The new substation is so designed that a material saving is accomplished by:

1. Designing the high-voltage insulation throughout so that its resistance to lightning and system voltage breakdown is greater than the resistance of the high-voltage trunk-line insulation itself. The high-voltage line insulation protects the small substation.
2. Substituting for the oil circuit breaker, relays, current transformer, and disconnecting switch, an interrupting and disconnecting device consisting of an expulsion fuse and current-limiting resistor unit, which will protect the high-voltage line against interruption due to faults in the step-down transformer or substation structure with negligible disturbance to the system.

The substation is designed for connection between one conductor of the high-tension line and ground, as the majority of high-voltage lines are operated grounded. The station comprises one high-voltage fuse and resistor, a single-bushing transformer and gives 2300-volt single-phase 60-cycle service. Low-voltage metering equipment, cutouts and arrester are included.

A number of novel features were incorporated (Fig. 6) to effect economy with an unusual degree of reliability. The transformer employs only one bushing. One end of the transformer winding is solidly grounded inside the tank. The oil in the tank and in the bushing is common, with a conservator mounted on the top of the bushing. Adequate shielding and clearances between the high-voltage and low-voltage windings prevent reflection of over-voltages to the low side by capacity coupling. The core and coils are designed to minimize the possibility of telephone interference. The magnetizing current is practically negligible.

The complete 66,000-volt substation sells for an amount comparable with the cost of building about a mile and a half of distribution line and should give more reliable service and better voltage regulation than the average rural-distribution line.

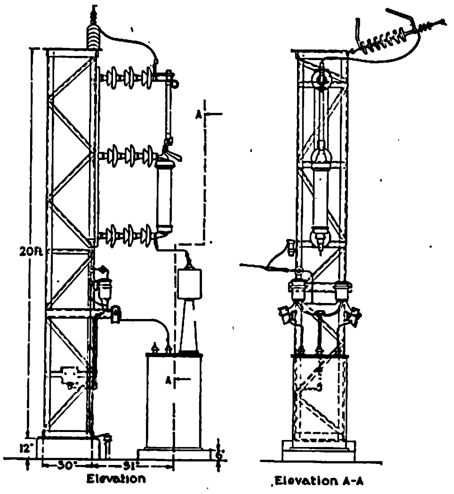

Fig. 6—Structural arrangement of outdoor farm-power substation equipment

Lighting

A preliminary estimate of the number of incandescent lamps sold in the United States during 1928 (Fig. 7) indicates 319 million large and 240 million miniature lamps. The former is an increase of about 1½ million (about a half of one per cent) and the latter an increase of about 20½ million (about 9½ per cent) over the previous year. These sales are the largest in the history of the industry.

The present standard line of lamps with inside frosted finish, which was introduced a little over two years ago, made excellent progress in replacing the corresponding old types of lamps in the straight-side clear bulbs. The demand for the new lamps is now about 98 per cent of the total demand for standard wattages. The remaining demand of 2 per cent for the old type lamps comes from special services where clear-bulb lamps are required.

The price trend for lamps has been downward for the past seven years and current prices for both large and miniature lamps (Fig. 8) show marked reductions as compared with those of 1914. At the close of the year, large lamp prices were 49.2 per cent and those for miniature lamps were 48 per cent of the corresponding 1914 figures.

A notable development was the introduction of the inside-colored lamp to supersede the outside-coated or sprayed-finish type previously used. While bulbs of natural-colored glass have been used to some extent, their relatively high price has limited their application.

Street Lighting

Intensive white-way lighting, *i.e.*, street lighting delivering from 300 to 2000 lumens per foot, was inaugurated in 1916 by the "Pathway of Gold" in San Francisco. Since that time, street illumination of this character has been adopted by more than 50 cities in the United States, the additions during the year including the cities of Detroit (Mich.), Kansas City (Mo.), Oakland (Cal.), Houston (Tex.), and Washington (D. C.).

Washington Boulevard, Detroit, became the best lighted street in the world with a new five-light ornamental illumination system. The lighting standards, placed in double rows along the parkway in the middle of the street, are of record size, giving an illumination per pole of 10,500 candle-power, which exceeds State Street, Chicago, heretofore the best lighted street, by more than 1000 candlepower. This was the first installation to utilize large Mazda lamps in groups of five to a standard.

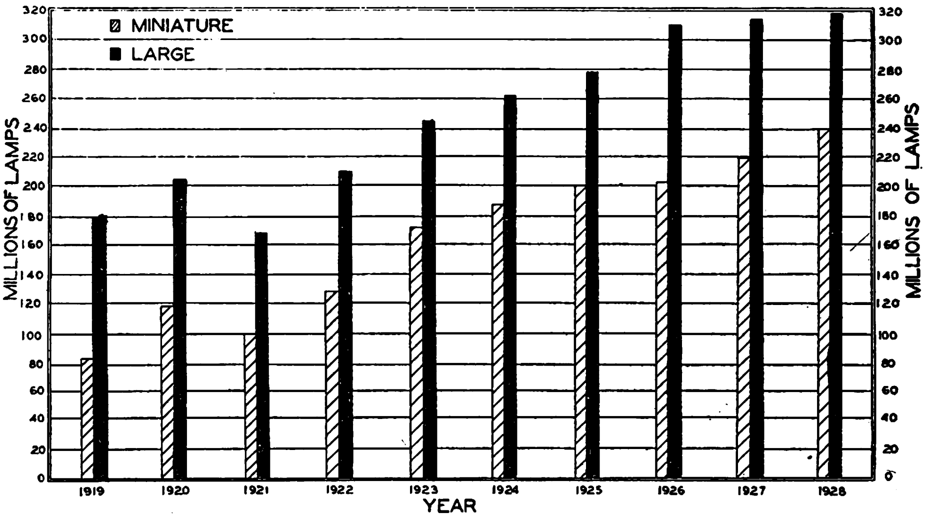

Fig. 7—Number of incandescent lamps sold in the United States, 1919-1928 (1928 *estimated)*

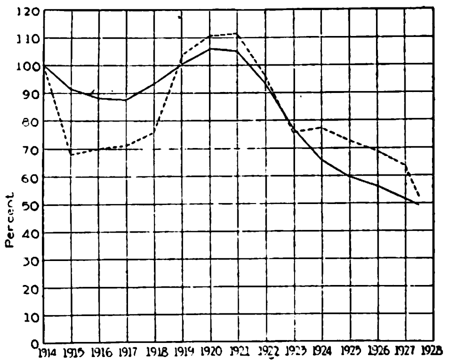

Fig. 8—Reductions in prices of Mazda Lamps since 1914

Floodlighting

There was an increased use of floodlights for the illumination of athletic grounds and stadiums to permit the holding of practically every type of open-air athletic contest at night. There was also a notable increase in the number of illuminated fountains; and the demand for this form of nocturnal decoration resulted in the practical standardization of several sizes of fountains with complete specifications for masonry work, wiring, and projectors.

One of the outstanding floodlighting projects of the year is that of the Cleveland Union Terminal Building, which has a tower rising to a height of 710 ft. above the pavement.

The upper terraced section of the tower, approximately 275 ft. in elevation, is lighted by a total of 220 floodlighting projectors installed upon the various parapets and ledges of the tower. They are equipped with lamps ranging from 200 watts to 1000 watts in rating and have a total connnected load of approximately 140 kw. An average intensity of illumination of 15 to 21 foot-candles is produced upon the objective areas of the tower.

No colored light was employed, all relief lighting effects being obtained by white light. Careful attention was given to such factors as the elimination of objectionable shadows, the uniformity of light distribution, relief lighting and maximum beam economy by means of diffusing and diverging glass doors for the projectors.

Very striking effects were obtained during the three-day celebration of the dedication of the Los Angeles new City Hall. The tower of this building is capped by the Lindbergh Air Beacon, which has a visibility range of between 50 and 60 miles. The illumination of the City Hall during the celebration was accomplished by means of a temporary installation of batteries of floodlight projectors.

An unusual example of decorative lighting was arranged for a conclave of the Knights Templar in the City of Detroit. It consisted of a jeweled arch 144 ft. wide, stretched on 75-ft. towers at the curbs, and flanked on either side by 35-ft. towers carrying the arch over the sidewalks.

The 26,000 glass jewels in the arch were illuminated by thirty-six 18-in. arc searchlights equipped with varied color screens and delivering an illumination of 540,000,000 beam candlepower.

Design of High Voltage Outdoor Substations

PART III

A series of six discussions on design of outdoor substations originally presented at a meeting of the 1926-1927 Electrical Apparatus Committee, Engineering National Section, H. R. Woodrow, chairman. The meeting at which these discussions were presented was conducted by the Substations Subcommittee under the chairmanship of R. A. Hentz.

Substations discussed in this series are: The Philadelphia Electric Company, by Raymond Bailey; Detroit Edison Company, by S. M. Dean; (December, 1928) Commonwealth Edison Company, by B. G. Jamieson; Pacific Gas & Electric Company, by B. D. Dexter; (January, 1929) Duquesne Light Company, by G. Sutherland; (this issue) Alabama Power Company, by L. M. Smith (next month).

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DUQUESNE LIGHT COMPANY

G. Sutherland

During the last two years the Duquesne Light Company has installed two high voltage outdoor substations, stepping down from 66 kv. to 22 kv. The outstanding characteristics of these two substations are:

1. Simplicity of layout.
2. Isolation of trouble by separation of buses and apparatus.
3. Increase of insulation values.

The station plan is its wiring diagram. The 66 kv. transmission lines run straight through the station with taps to the transformer banks at right angle to the transmission lines, and the 22 kv. buses extend from the banks in straight lines. Unit type steel supports for the buses, oil circuit breakers, disconnecting switches and potential trans-

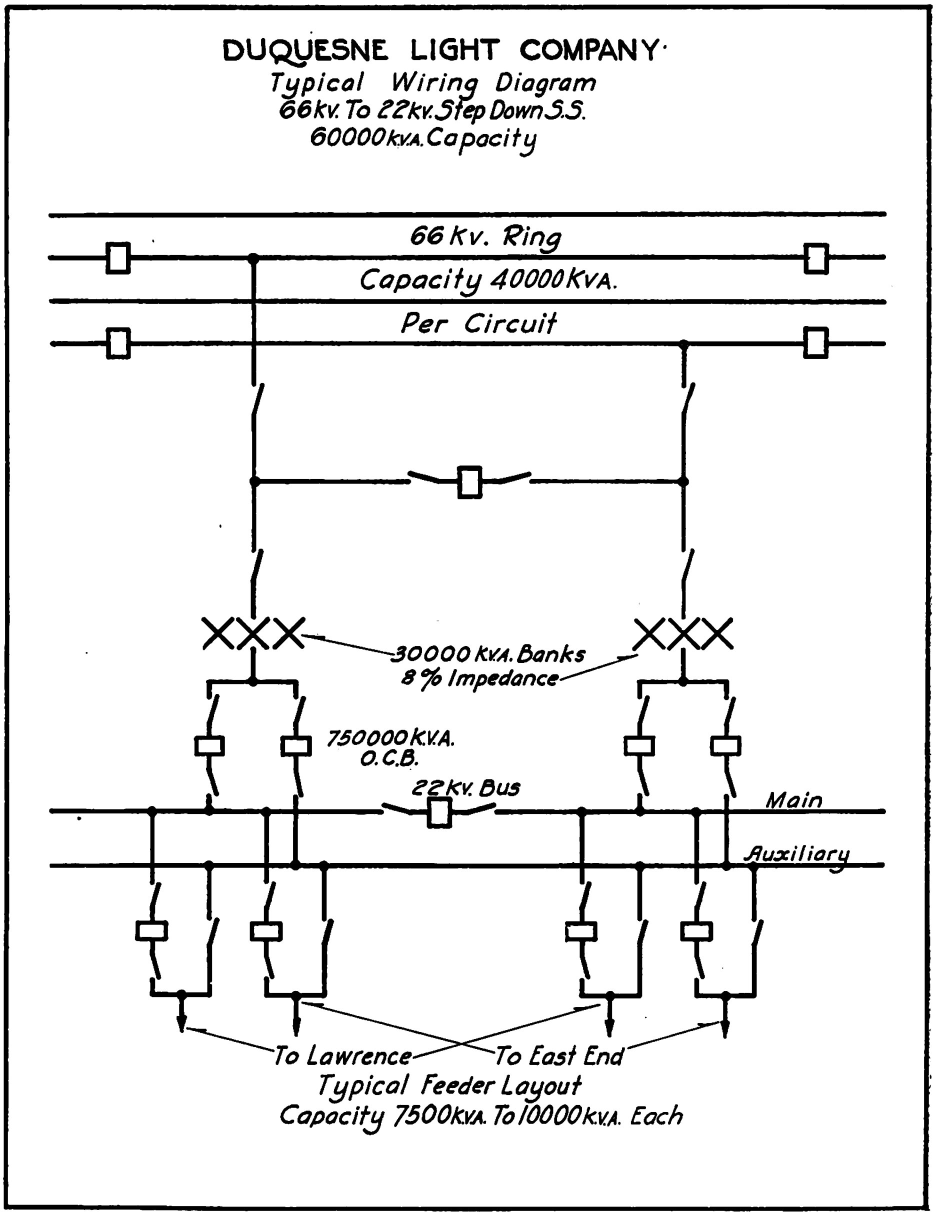

DUQUESNE LIGHT COMPANY
Typical Wiring Diagram
66kv. To 22kv. Step Down S.S.
60000 kva. Capacity
66 Kv. Ring
Capacity 40000 Kva.
Per Circuit
30000 kva. Banks
8% Impedance
750000 kva.
O.C.B.
22kv. Bus
Main
Auxiliary
To Lawrence
To East End
Typical Feeder Layout
Capacity 7500 kva. To 10000 kva. Each

Fig. 26. Typical Wiring Diagram of Substation, Duquesne Light Co.

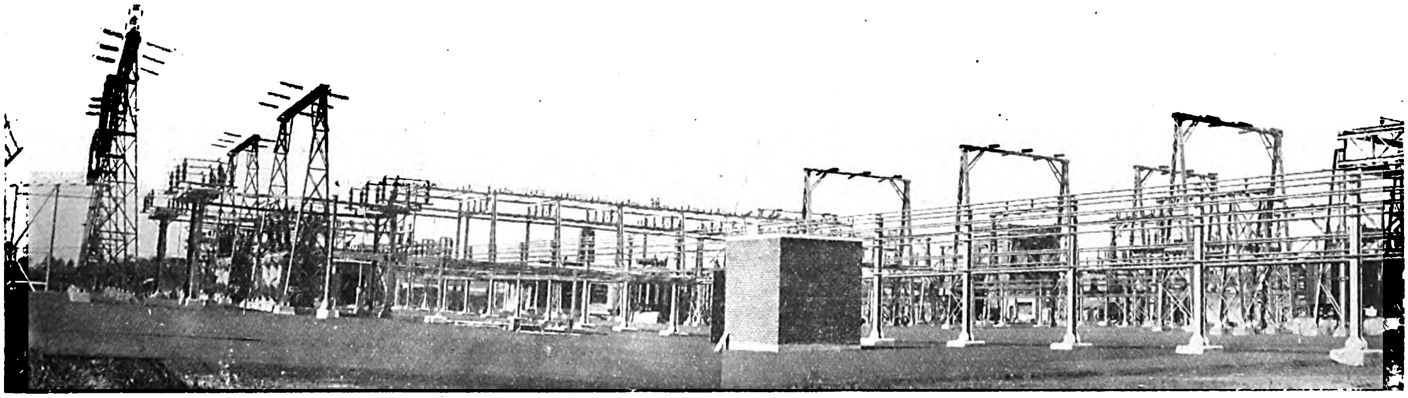


Fig. 27. Valley Substation—General View—66 Kv. Structures

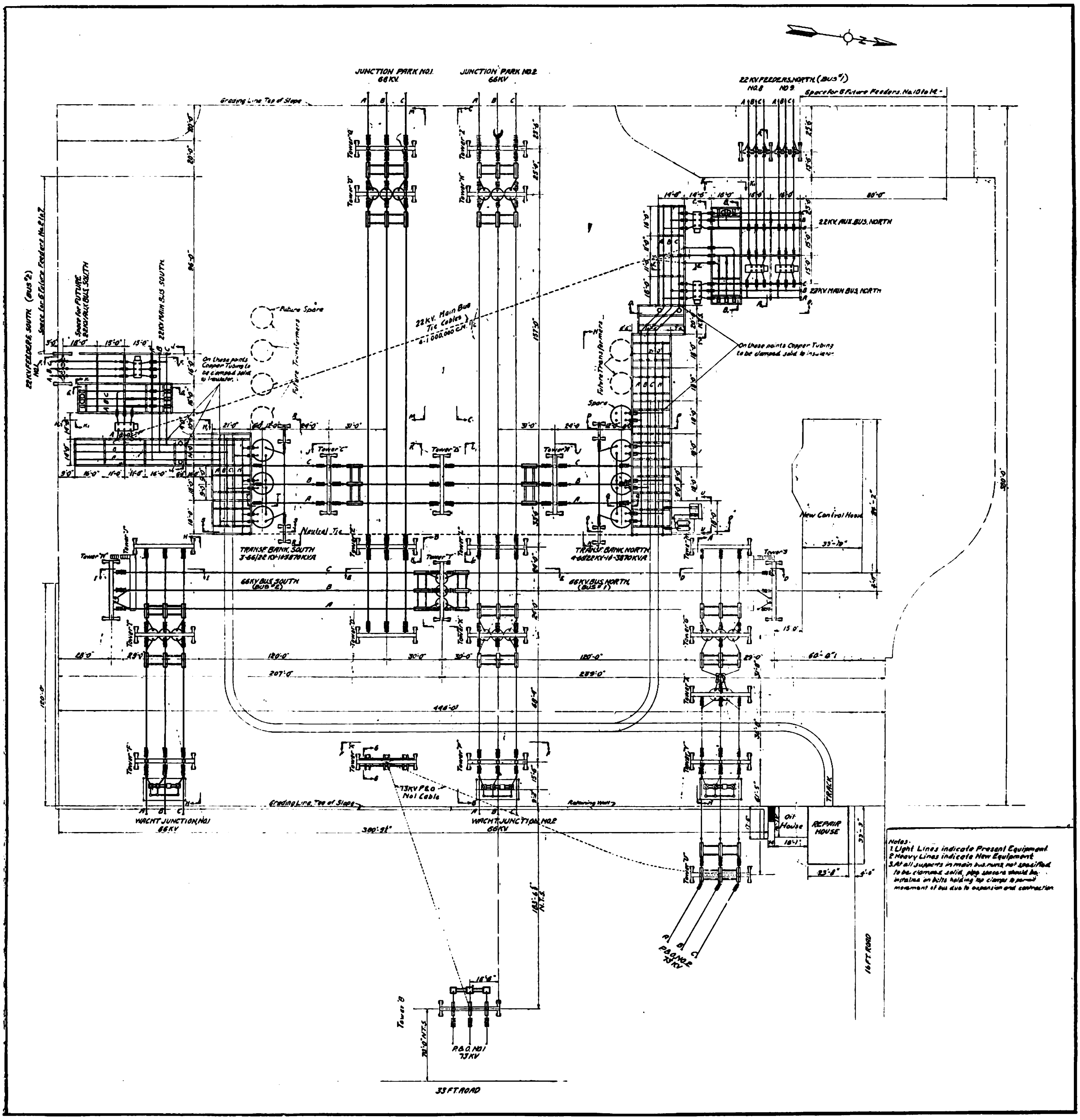
formers simplify the structural layout and efficiently eliminate the mass of steel prevalent in stations of earlier design. The elimination of high cost, high tension oil circuit breakers on the 66 kv. side of the transformer banks further simplifies the layout.

In order to isolate trouble the high tension buses are installed on 65 ft. centers with unit type supporting structures and the high voltage breakers are widely separated by their location in the lines.

Insulation values have been raised on both the high voltage and low voltage equipment from 30 to 60 per cent.

The details of the electrical layout are as follows:

On the 66 kv. side the transmission lines run straight through the station with taps to the transformer banks, the lines and taps forming the high tension bus. In order to bring two lines on the same tower into separate sections of the bus and avoid complicated crossovers 75 kv. single conducted cable is used to make the crossovers. Each incoming and outgoing line has a circuit breaker with its disconnecting switches, and a lightning arrester. Choke coils are used in these two substations although there is a tendency among our engineers to eliminate them because there is no evidence to substantiate their effectiveness. The transformers are tied to the bus through horned air break disconnecting switches only. There is, however, an oil circuit breaker between each pair of transformer banks


JUNCTION PARK NO.1 66KV
JUNCTION PARK NO.2 66KV
22KV FEEDERS NORTH (BUS 1)
Space for 6 Future Feeders
22KV AUX. BUS NORTH
22KV MAIN BUS NORTH
22KV FEEDERS SOUTH (BUS 2)
22KV MAIN BUS SOUTH
22KV Main Bus Tie Cables
Future Spare
Future Transformers
Spare
Neutral Tie
TRANSF BANK SOUTH
TRANSF BANK NORTH
66KV BUS SOUTH (BUS 2)
66KV BUS NORTH (BUS 1)
New Control House
Oil House
REPAIR HOUSE
TRACK
Grading Line Top of Slope
Retaining Wall
73KV P&O No1 Cable
WACHT JUNCTION NO.1 66KV
WACHT JUNCTION NO.2 66KV
P&O No.2 73KV
P&O No.1 73KV
16 FT ROAD
33 FT ROAD

Notes.
1. Light Lines indicate Present Equipment
2. Heavy Lines indicate New Equipment
3. At all supports in main bus runs not specified to be clamped solid, pipe spacers should be installed on bolts holding top clamps to permit movement of bus due to expansion and contraction

Fig. 28. Valley Substation—General Arrangement Plan

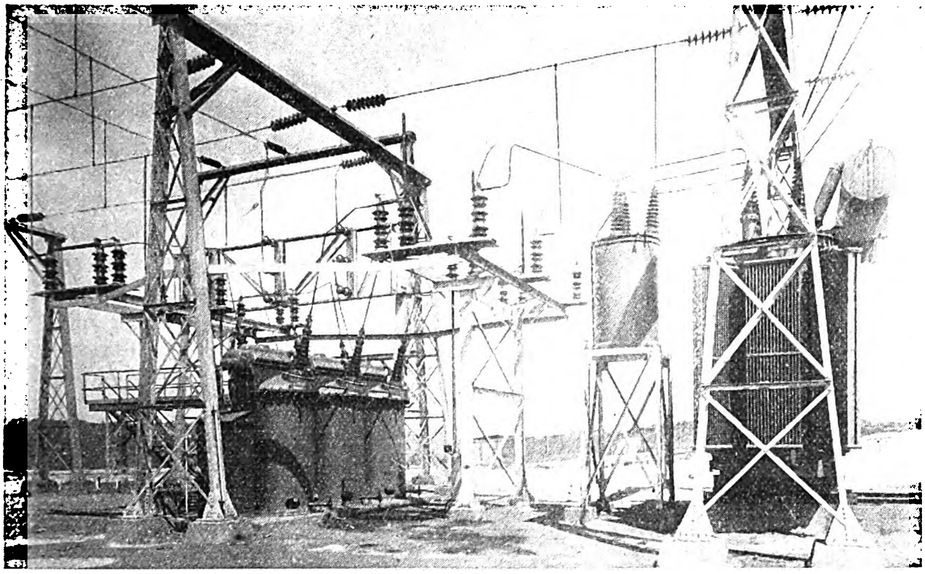


Fig. 29. *Auto Transformer, Metering Unit and Oil Circuit Breaker—Valley Substation—P. & O. Tie*

in order to confine trouble to one bank only. Insulator flashover values are 200 kv. wet and 260 kv. dry. These figures contrast with 120 kv. wet and 165 kv. dry installed in earlier stations.

This means that the stations are slightly over insulated, but the flashover value of the station equipment is considerably under the flashover value of the lines, the latter being approximately 275 kv. wet and 350 kv. dry.

On the 22 kv. side there is a main bus for each transformer bank with oil circuit breakers between sections. The auxiliary bus is unsectionalized. Duplicate lines to each distribution substation are tied to separate bus sections with oil circuit breakers for the main bus connections and disconnecting switches only for the auxiliary bus connections.

33 kv. three conductor cable is used in certain line connections in order to avoid overhead crossovers. Each line is equipped with station type lightning arresters with choke coils at one station only. At the other station 22 kv. choke coils are eliminated. The insulation flashover values are 140 kv. wet and 195 kv. dry, contrasting with former figures of 75 kv. wet and 105 kv. dry.

On the 22 kv. side of the station the increase in flashover value of the apparatus has been made possible by the development of better equipment on the part of the manufacturer. Our practice is to insulate for the next higher standard voltage above that which is used in normal operation. Thus, on the 22 kv. system 37 kv. equipment is used, selected to give the flashover values named.

The relay protection on the 66 kv. ring is of the two circuit balanced type. However, this has not been entirely

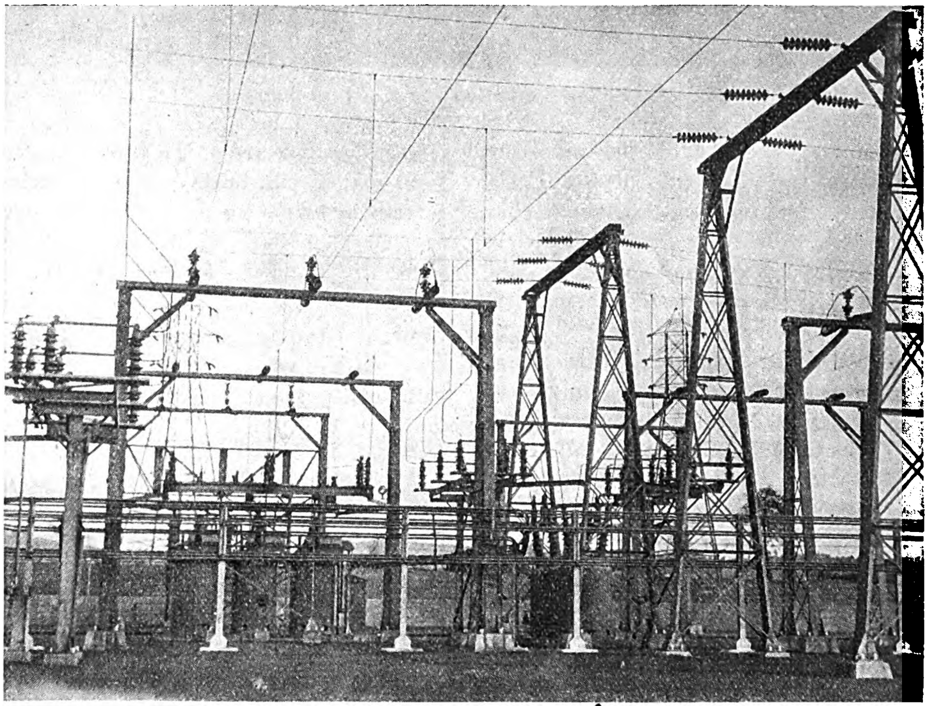


Fig. 30. *Valley Substation—66 Kv. Line and Bus Tie Breakers*

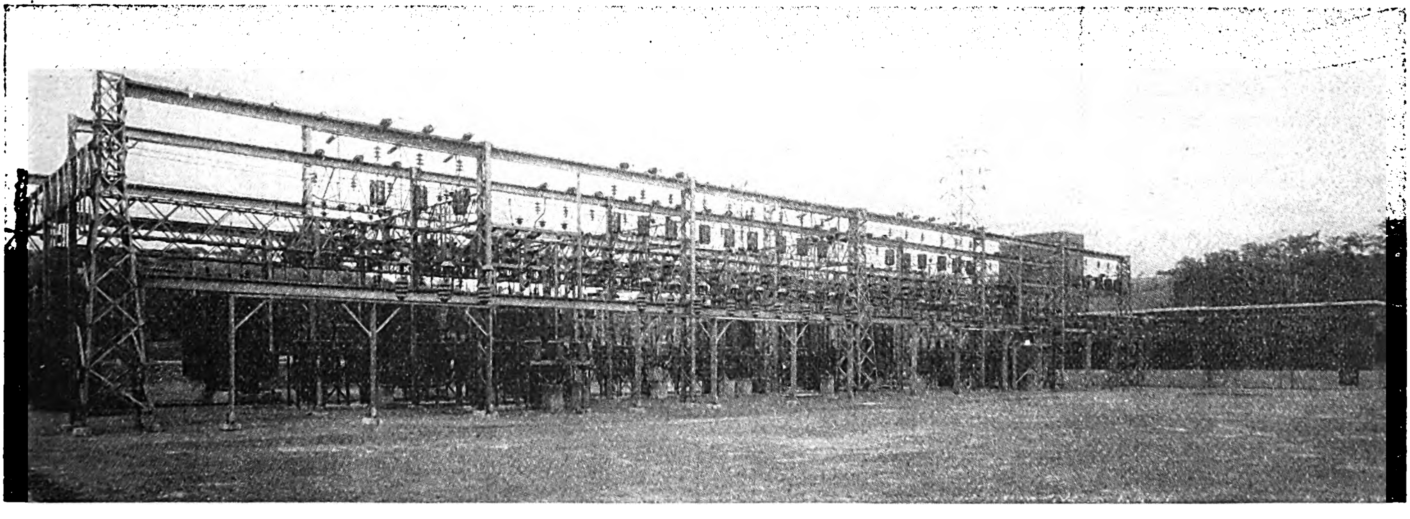


Fig. 31. *Pine Creek Substation—General View—22 Kv. Structure*

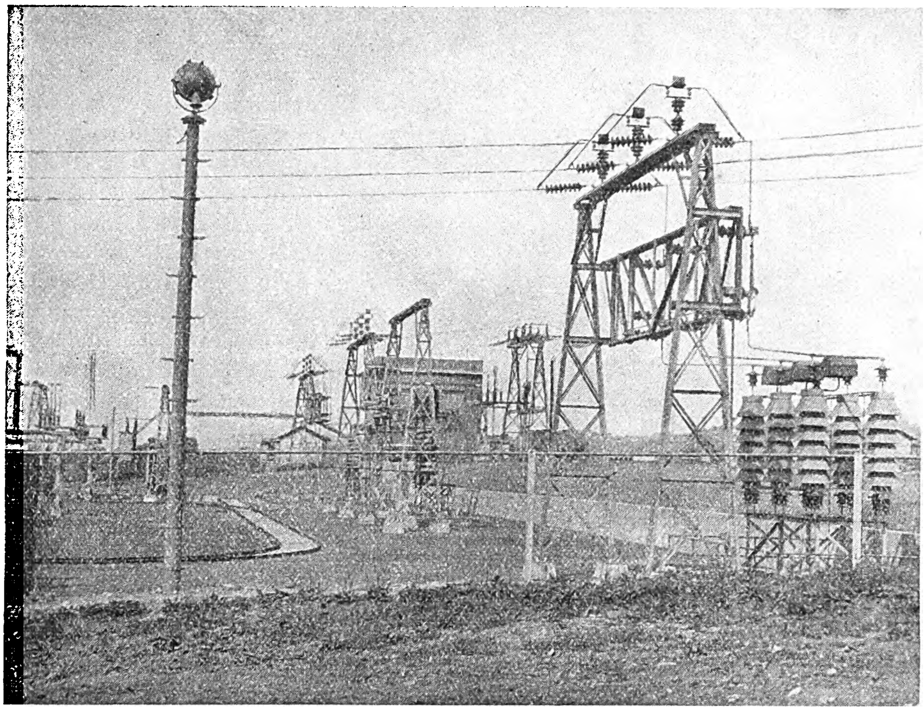


Fig. 32. Valley Substation—66 Kv. Line Entrances

satisfactory because of the numerous duplicate faults on the line and the necessity for backing up single line protection, which has not been entirely reliable. A directional overload and ground protection scheme is being considered for the 66 kv. lines. The 22 kv. feeders are equipped with directional overload protection and ground relays are installed experimentally.

Mechanical details are as follows:

The 66 kv. bus to bus distance is 60 ft. center to center in one station, and 65 ft. in the other. This difference is due to property limitations in the one case. The high tension bus is composed of 4/0 hard drawn stranded copper spaced 10 ft. phase to phase and is insulated with 7 disc insulators per string. Separate steel "A" frames support the bus, each structure being designed to withstand the stresses of three wires. Separate structures support the disconnecting switches and the potential transformers with their respective leads and, wherever the contour of the ground necessitates, the unit structures are on different elevations. The 22 kv. buses are spaced 16 ft. center to center with 4 ft. spacing between phases. The bus itself is of 2 in. copper tubing with taps of ¾ in. tubing. There is a common steel structure for all disconnecting switches and to support the buses, but the lightning arresters and the potential transformers are installed on unit type structures.

The equipment is both Westinghouse and General Electric. The 66 kv. oil circuit breakers are of the floor mounted type with 60 in. tanks and have an interrupting capacity of from 1,000,000 to 1,500,000 kv-a. In the two stations there are breakers of both the Westinghouse G-22 132 kv. type and the General Electric Company FHKO 39-60-C 88 kv. type. The 22 kv. oil circuit breakers are floor mounted with tanks of two diameters, 28 in. and 32 in. and with an interrupting capacity of 750,000 kv-a. Two types are used, the Westinghouse 0-331 and the General Electric Company FHKO 39-32-BY. The disconnecting switches are of the single vertical break type, gang-operated and interlocked with the oil circuit breakers by the Cory Interlock System. The lightning arresters are the covered gap valve type, both auto valve and oxide film. Wherever choke coils are installed the material is copper. The power transformers are 10,000 kv-a., single phase, connected 66 kv. Delta to 22 kv. Star with 3¾ ohm resistors in the neutral of the 22 kv. connections. The stations are designed for a first step capacity of 30,000 kv-a., one spare transformer being installed with the first bank and an ultimate capacity of 90,000 kv-a. with space for 120,000 kv-a. if required. Potential transformers are of the single bushing type on the 66 kv. system and single phase on the 22 kv. with 37 kv. insulation. The neutral resistor is of the outdoor grid type and has a rating of 800 amperes for 30 seconds.

Apparatus has been chosen and laid out to maintain the greatest practical separation and obtain highest insulation values consistent with economy and a well balanced engineering design. The slight increase in cost due to increased insulation has been well justified by the decrease in operation troubles.

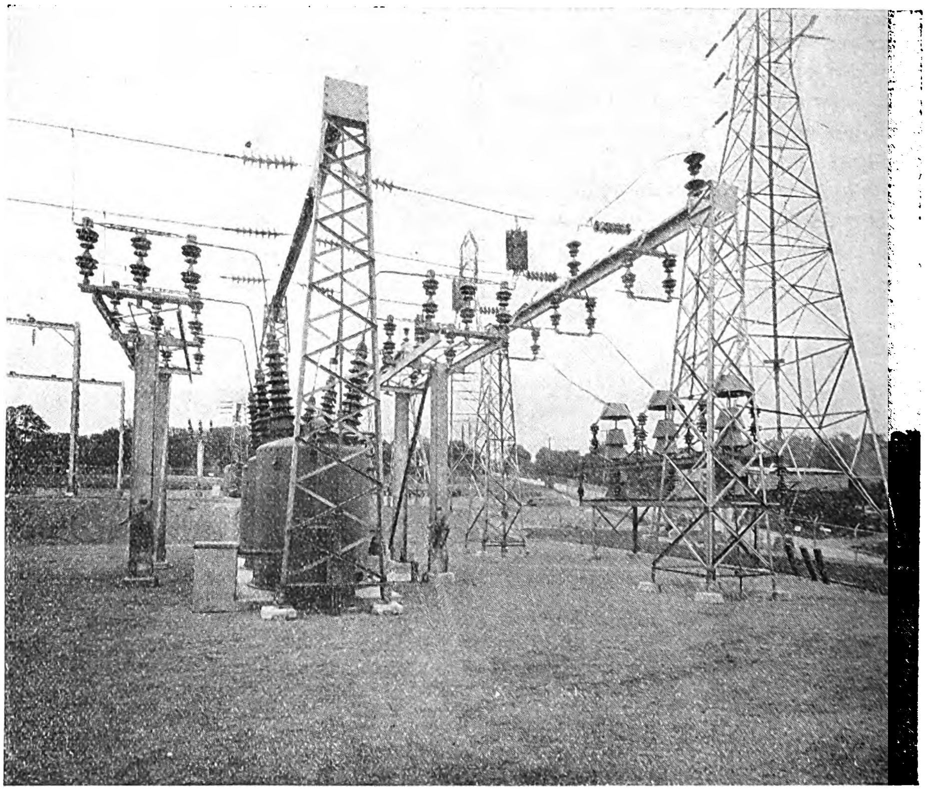


Fig. 33. Pine Creek Substation—General View—66 Kv. Line Equipment

Service Suggestions

NATIONAL ELECTRIC LIGHT ASSOCIATION COMMERCIAL NATIONAL SECTION
CUSTOMER RELATIONS COMMITTEE
H. T. EAST, *Chairman*, Public Service Co. of Northern Illinois, Chicago, Ill.
To formulate efficient methods of conducting relations between the customer, the public and the supply company, including such matters as taking applications in the office, forms, order routing, inquiries, complaints, meter reading, collections and credits

No. 68 **February, 1929**

Training Employees in Customer Relations

By C. E. MICHEL

Union Electric Light and Power Company, St. Louis, Missouri

THE importance of having and holding the good-will of the public has long been realized in the public utility industry. Many factors contribute to mold public opinion and the more progressive units of the industry have sought in various ways to conduct their business in a manner which would merit the good-will which is essential to the progress and well being of the industry.

It was only after considerable headway had been made in the program of electrifying homes in the industry, and sales activities were intensified and broadened in an effort to open up new markets and materially increase the per meter consumption of customers, that it was realized customer good-will and confidence had a decided influence upon the success of sales efforts. Unless there is a background of customer good-will and confidence, selling processes become long and tedious ones. Good customer relations has a decided effect upon sales activities as well as upon other phases of our business. Once this fact was realized the directive heads of the light and power industry gave the subject of customer good-will more thought and attention.

What Is Major Influence in Forming Customer's Opinions?

With full knowledge that our company enjoyed an excellent reputation among our customers, who, by the way, held approximately $20,000,000 of our preferred stocks, we decided that there still remained plenty of room for improvement and set out to find the answer to the question, "What is the major influence in forming the customer's opinion of us?"

> Service Suggestions serve their intended purpose only when the ideas and suggestions they carry are put to work. Many companies make it a point to provide all department heads with copies of each issue. Additional copies in leaflet form are available at a nominal price and may be ordered direct from the Chairman.
>
> H. T. EAST, CHAIRMAN
> 1427 Edison Bldg., Chicago

Our study was predicated on the knowledge that we were conducting a large and successful business, were giving good service and were charging therefor at equitable rates. Many subjects bearing on this question were scrutinized and an attempt made to evaluate them. The result was an unanimous conclusion that personal contact with employees stood first on the list. In a paper by Mr. Bernard Mullaney prepared for the American Gas Association we found valuable corroborative evidence of the accuracy of our conclusion.

Mr. Mullaney gave the results of an extensive investigation made by a group of gas companies, to determine what their customers thought of them—and why. Over 15,000 customers were interviewed and asked a series of carefully prepared questions regarding their attitude toward the company. Mr. Mullaney sums up the findings of this investigation in the following paragraph:

> "In this analysis and rating it was found that the impression left by PERSONAL CONTACT WITH EMPLOYEES was twice as strong as all other factors combined in determining the customer's estimate of our service. In other words, the impression left by contact with meter readers, collectors, fitters, telephone clerks, receivers and so on, was twice as important as the promptness, dependability, efficiency and all around physical quality of the service itself."

The Employee Is the Answer

It will be observed that this statement carried with it no qualifications of any kind. It is clear cut and conclusive, based upon facts, not theories. Here is a case where, with millions invested in physical equipment, where large sums had been spent in advertising to solicit the good-will of the public, careful analysis forced the conclusion that the impressions made by employees have had more to do with public opinion of the company than has any other combination or the qualities of the service itself.

It appears that no matter how much advertising we have done, its effect will be forgotten if the employee does not leave a good impression when service is rendered. No matter how fair the rate may be, we will get but little credit if the customer pays his bill to a disagreeable cashier, and no matter how efficiently we perform the innumerable other tasks which bring us into personal contact with our customers, the painstaking work behind that action is lost unless the employee contact is satisfactory to the customer.

If the personality of the employee is so important, then upon what is this personality based? What causes one employee to make a good impression upon the customer and another to make a poor impression? What governs the conduct of the employee as he stands face to face with the customer? If so much depends on this conduct, is it possible to, in any way, control or standardize that conduct?

Human Conduct Based Upon Training

We may start with a truth that is as old as history itself—human conduct is based upon training. No matter how loyal an employee may be, no matter how good his intentions may be—his conduct in the presence of the customer cannot be much better than the training he has received. In fact, he will not even use common courtesy unless someone has taught him what courtesy is and trained him to use it in his every day life.

This analysis brings us to two conclusions:

1. Employee contact with the customer is one of the most important factors in customer relations.
2. Proper training of the employee is the key to the right type of employee conduct.

In the matter of employee relations with the company we had gone far and subsequent events revealed the fact of the time and money expended in that direction. Disloyalty in the ranks was found to be simply not existent, but in the matter of employee training in the handling of the public, we had followed less scientific and effective methods.

True, we had made every effort to employ the right type of people. Department heads were instructing their employees to be courteous and diplomatic, to take a friendly and personal interest in each customer, but the interpretation of these terms was being left largely to the imagination of the employee. In short, the employees were being told to make a good impression upon the customer, but, with few exceptions, they were not being taught how to do it. Some departments were functioning well, others were not. Some individuals were functioning well, while others, in the same department and in all other respects excellent employees, were failing.

Not the Job of Department Heads

We had always considered it the department head's responsibility to give his employees whatever training they needed. But as we became more conscious of the importance of the right kind of employee contact with our customers, we realized that, while we were doing a fair job, it was not up to the standard of our expectations. Furthermore, we came to realize that we could not expect the department heads to get the results we wanted. We had expected them to handle a job entirely outside of their field of training. Our department heads were engineers or business specialists of one kind or another, but not human engineers. They were not instructors and lacked experience in organizing a program of personal training that would give the employees definite methods of meeting and handling the public. Even had they known how to organize the material, they were not experienced in presenting it in a comprehensive way and, in addition, they did not have the time to give the problem the necessary thought and attention.

Here we were with a group of approximately five hundred employees meeting our customers almost daily. It was a well paid, satisfied and loyal group, that we had every reason to believe would rather handle the customer in the right way than in the wrong way, and yet the failure to do that marked the work of an appreciable percent of these employees. We had standardized our service, why couldn't we standardize the employees' method of rendering that service? The conclusion was that this could be done within certain limits, providing organized training was put into effect.

Employee Training Services Investigated

Our first step in that direction was the investigation of several services offered by companies engaged in various systems of employee training. The result was very largely a mass of printed material in the form of poster service or weekly letters to employees, and most of it carried the inherent weaknesses that mark that class of literature. We felt that, while there was merit in some of the plans offered, in general they failed to serve our particular needs, in that they did not apply specifically to our business, and, with few exceptions, made no attempt to define specifically the technique of meeting and handling customers.

Early in 1928 there came to our attention a magazine article entitled, "The Cash Value of Personality in Business." The article was a short, practical and convincing discussion of employee training, as it affected customer relations, and I would like to digress long enough to suggest to anyone interested in this subject that he secure a copy of the *Rotarian* of March, 1928, and read that article.

This article was of major influence in crystallizing our ideas as to exactly what kind of training we wished to provide for our customer contact employees and led to the employment of a firm of business engineers capable of undertaking the task from the standpoints of experience and method and, what is of equal and possibly greater importance, which offered the services of an individual qualified to get the message over. The method of conducting this training and the results achieved, we believe, make this report of general interest to the industry.

Survey of Employee Contact with Public

Since the essential of all training is facts, the first step was to obtain these by means of a survey disclosing how our employees were handling the public. Trained operators, acting as customers, sought these out by personal contact with the employees in every department having contact with customers, and the information so gained became the property of the investigating company. The individual reports bearing the name of the employee interviewed, at no time, were shown to our company, and for the reason that this survey was not made with a view of measuring the relative value of employees, but to furnish the basis for the specific application of the principles of the course to our individual needs. They purchased all kinds of merchandise, from curling irons to electric refrigerators. Acting as consulting engineers in the offices of some of our large industrial accounts, they challenged our salesmen on rates and service. They complained about demand charges to the complaint department; they attacked our billing methods. Orders were given for the connection and disconnection of service. Dozens of inquiries and complaints were made by telephone to test the efficiency of the telephone service. The operators placed themselves in homes and observed the conduct of meter readers and service men. They even went so far, in one case, as to throw water on the kitchen floor and reproach the meter reader for tracking it, in order that they might know how he would handle himself under an unjust criticism of that kind.

Nothing was taken for granted and every effort made to avoid inaccuracies. In certain cases where the data was questioned, the operators went back as many as three times in order to recheck their findings. When the survey was completed, the investigating company had come in actual personal contact with more than two hundred and fifty of the five hundred employees involved, and a written report was made on each of these interviewed. These reports covered the essentials of the employee's conduct during the transaction; in many cases, including the conversation that took place, with the description of facial expression, tone of voice and general attitude. In short, they were intimate personal records of each transaction, made by people who had the customer's viewpoint and were, at the same time, experts in employee psychology.

A Complete Picture of Employee Contact with Customers

With the name of the employee deleted, this survey was laid before us, and from it we got a most complete picture of our organization in its contact with our customers. For the first time we saw our service as it was actually being rendered to the public. There was revealed, of course, the usual instances of customer neglect and, in a few cases, downright inefficiency and rudeness on the part of an employee but, on the whole, actual discourtesy and disloyalty were lacking. The important finding of the survey was a thing far more subtle.

The survey disclosed that, while we were getting by without antagonizing our customers, in far too many cases they were not being treated in a manner that caused them to become friends of the company. That while they had no special reason for complaint, neither did they have much occasion to be enthusiastic about our service. The key note of our organization was mechanical monotony. Over and over the survey reports read, "Too mechanical," "Lack of enthusiasm," "Lack of spirit," and we found that there was lacking that real red blooded interest, that personal touch with the customer which turns a mere customer into a friend. We were allowing our customers to feel the very thing we did not want them to feel—that we were just another large corporation. It is one thing to take care of a customer without creating antagonism; it is quite another to make the transaction so pleasant that the customer will remember it and perchance mention it to a friend at some time in the future and, in our opinion, therein, lies the core of the customer relation problem.

Training Course Decided Upon

The next step was to call a meeting of our department heads to explain to them the details of the survey that had been made, the reason therefor, and to outline the program of voluntary training that would be offered to this group of employees.

There followed a meeting of the department heads and of the special group of our customer contact employees, at which meeting they were told of the survey and of the two hundred and fifty reports that had been made. It was explained to them that these reports were the property of the survey company and were not available to the executives of our company. That the only person in our company who could read the individual reports was the employee upon whom it was written. In this way, the employees were assured that the purpose of the survey was the gathering of information, the result of which would help them in their work, and not to form the basis of individual reports to the company. The employees were invited to see the man we had employed to conduct the course in a private interview at an office assigned to him for that purpose, at which interview the report on the individual would be discussed with him; and the fact that over two hundred and twenty-five employees did actually take advantage of this opportunity is evidence of the interest aroused.

A series of six lectures, in addition to this meeting, was announced, at which the findings of the survey would be disclosed, mistakes cited and suggestions for improvement made. The lectures were to be given in our own auditorium, and were scheduled over a period of three weeks, two evenings a week, two hours to each lecture with a fifteen minute recess. The special contact group of employees and all those in supervisory capacities were invited to attend. Attendance was not made compulsory and the cost of the course was borne by the company.

The Lectures

Briefly outlined, the subject matter of the lectures was as follows:

1. *Business Personality*—In this lecture the various characteristics of personality were discussed. Based upon survey findings the employees were shown their personal characteristics which were creating a negative reaction upon the customers. Other characteristic which would have a favorable reaction were given to them. Many illustrations taken from the survey were cited as examples.

2. *Business Personality*—This lecture was a continuation of the first lecture. In these two lectures the definite factors of business personality were thoroughly analyzed, classified as to their importance and applied to our particular field. The importance of the employee's position was pointed out, in that they were not "just clerks" or "just delivery-men," but individuals with personalities to be exercised in dealing with customers. Survey illustrations were again used to show how each individual is a personal representative of the company and that in so far as the customer is concerned, the employee IS the company.

3. *The Customer's Personality*—Here the characteristics of the average customer were discussed. Methods of handling different types of customers were presented with a view to giving individual service. The employees were shown that customers were not "just customers," but individuals with personalities of their own which must be intelligently considered before the customer could be properly dealt with.

4. *Self Organization*—This lecture took up the employee's daily habits on the job, enforced with specific illustrations and data from the survey reports. They were shown how their fundamental habits of thought governed their performance—that they could not successfully handle customers unless they could first successfully handle themselves. That they could not control their conduct in the presence of customers unless they were able to control their own moods. Simple yet effective methods for improvement were suggested.

5. *What is Salesmanship*—The first purpose of this lecture was to remove the false ideas many have on so-called scientific salesmanship. They were shown that the foundation of all salesmanship is to interpret intelligently the customer's need and fit the company's service to that need. The failure to do this was emphasized as one of the outstanding weaknesses found during the survey. Methods of applying this type of selling in the utility business were given them.

6. *Personal Progress*—The last lecture was an appeal to the employee's self interest. They were brought face to face with their future and made to realize that their positions five years ahead depended upon the efforts they were making now to better themselves at their jobs. A program for broadening their education and preparing themselves for better jobs and greater responsibility and success was outlined in a daily program of study. Responsibility to families was also stressed.

At the end of each lecture a printed outline thereof was handed those attending. The outlines were intentionally brief so there would not be enough reading matter to discourage frequent reviews.

The Charts

During the course of the lectures each employee was given ten copies of a printed chart upon which the factors of personality affecting customer relations were listed. They were asked to pass out nine of these charts to different people, such as fellow workers, friends, customers and wives. These people gave the employee a detailed grading on the various factors of his personality, based upon his daily conduct, and returned the card by mail, unsigned. He graded himself on one copy so that he could compare his opinion of himself with that held by others.

After the charts were graded and returned to the employee, they gave him a picture of himself in black and white. His weaknesses stood out like sore thumbs, showing him that the criticism and instruction received during the lectures, applied to him and not to the fellow sitting next to him.

This outline may sound pedagogical, but the reverse is true. Our employees not only learned what mistakes they were making, but also learned how to correct them. They received detailed and implicit instructions in handling customers. Concrete examples were acted out on the platform, illustrating facial expressions, tone of voice, personal attitude and many other factors which enter into the art of making friends of customers. Detailed methods of answering questions were likewise given.

The lectures were given in plain understandable language and were made entertaining at the same time through the use of humorous comments on various departments, so that the audience was always in a cheerful and receptive frame of mind.

It would be difficult to conceive of any effort along educational lines being more enthusiastically received than were these lectures. While they were in progress they were the chief topic of conversation throughout the organization, and probably the best evidence of the interest taken is the attendance record, which is given here.

Attendance Record at Lectures

Lecture Number	** Total Attendance*	*Attendance in % of Number Invited*
1	467	89
2	496	95
3	464	88
4	469	89
5	482	92
6	** 446	85
7	465	89
Total	3,289	—
Average	470	90

*Excludes the attendance of special groups at certain lectures.

**One of the worst thunderstorms of the season started about one-half hour before the time set for this lecture.

As the attendance was voluntary, the significance of this record is apparent. It is worth noting that the attendance at the last lecture was about equal to the average for the entire series, and that the average throughout was 90 per cent of those eligible. This in spite of the fact that the lectures were given during the month of June when vacations were in progress and when the weather was unfavorable.

In addition to the above figures a number of employees not originally invited asked permission to attend, after hearing reports from those present. To the extent of available space, they were accommodated, and among these were a surprising number of linemen, groundmen and men from the plants, employees who seldom contact with the public.

Private Interviews

Paralleling the lectures, the lecturer held private interviews with employees who requested them. Reports taken during the survey were analyzed, weaknesses pointed out, individual problems discussed and employees were given definite methods of overcoming their difficulties with customers. The value of these interviews cannot be overestimated.

Special Meetings

In two special meetings—one for department heads and one for division heads—and without using any names, the employee's side of the story was then presented to our executives and to the staff. In these meetings the department heads and division heads were given a picture of themselves as their employees saw them. The psychology of the employee was analyzed, the causes for misunderstandings developed and the methods of avoiding these set forth.

At these meetings a simple chart was handed out, on which to make a periodic check on the performance of employees. The chart was arranged to reveal weaknesses as they developed, so that intelligent assistance could be given the employee in overcoming them.

General

We have given a rough sketch of the work that was done in an effort to train our people to a higher standard of customer relations. Since this work included varied activities, a brief summary may be of assistance in grasping the plan in its entirety.

1. By means of the survey we found out how our employees were handling our customers.
2. Through the lectures we analyzed our mistakes and supplied methods of correcting them. We gave our employees a definite technique in handling customers.
3. Through the use of individual analysis charts we uncovered the weaknesses of each individual and showed him how to correct them.
4. Through private consultations we individualized the training. Through these interviews we also found out what our employees thought of us and uncovered conditions that were detrimental to the morale of our organization.
5. We gave our department and division heads a definite method of checking the performance of their employees on matters that had been covered in the course, as well as a plan to correct weaknesses.
6. We brought to our employees a realization that individual efficiency, energy and loyalty, while valuable to their company, was of greater value to themselves as the foundation on which their own futures must be built.

The question as to what this work has accomplished logically follows. Obviously it would be impossible to say just how far reaching this program has been. Like advertising, the results cannot be reduced to mathematical terms. However, we have had definite proof that the work has borne fruit.

We have seen improvement in dozens of individuals, so marked that they were noticed generally. The influence of the work has spread throughout entire departments. Our methods of handling customers over the telephone has been improved to a remarkable extent. The morale and esprit de corps has been improved, and unquestionably our employees are more "customer minded," and are putting more spirit and enthusiasm in their customer contacts.

The effect of this attitude is shown in the reaction of our customers. With surprising frequency they have voluntarily reported instances of unusual courtesy shown them by our employees. We are actually making friends of our customers.

This does not mean that our customer relations problem is completely solved, but we have at least laid a solid foundation upon which to build. We have learned that it is good economy at any cost to give this training to the employees responsible for our reputation.

The cost is not great. The total cost of training each employee under the

(Continued on page 109)

A Word About the Building

To House the 52nd CONVENTION and EXHIBITION

THE great new convention hall at Atlantic City where the 52nd convention and electrical exhibition of the National Electric Light Association will be held in June, 1929, is said to be the largest and most complete auditorium of its kind in the world. Work on its construction is still being rushed so that the auditorium will be available soon after the first of the year.

It has been estimated that the entire building will cost at least $12,000,000. It is located on the boardwalk, facing directly on the ocean, and occupies an entire city square, being 350 ft. in width and 650 ft. deep. It is within three squares of the Reading Railroad terminal and within convenient distance of the larger hotels. Trains of the Reading and Pennsylvania railroads can be operated to the ground floor entrance. There is parking space within the building for 400 automobiles.

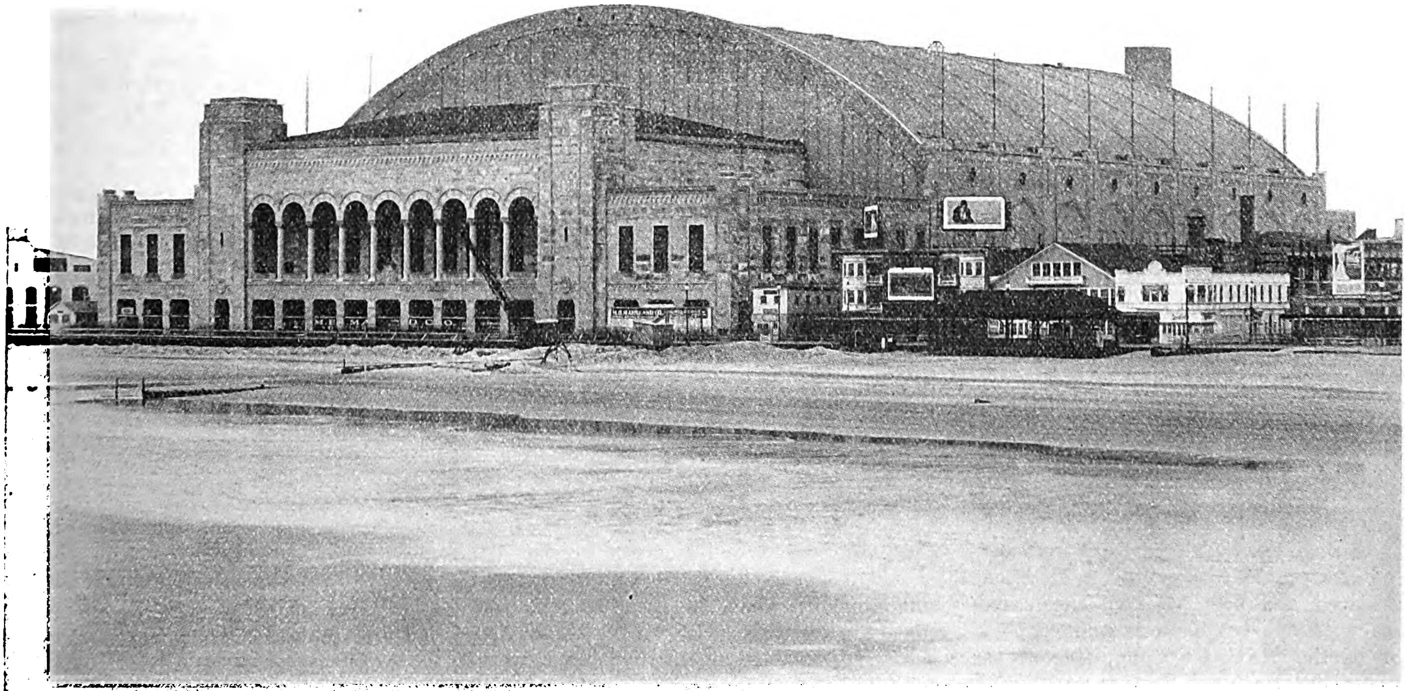
Thirty-three thousand people can be seated in the main auditorium. The ballroom, located on the boardwalk front of the building, can seat 3500 more, while there are accommodations for additional thousands in the numerous smaller meeting and committee rooms. Despite its enormous size, the acoustic properties of the main auditorium are so excellent that without being raised above an ordinary pitch, the human voice can be heard from one end of the great room to the other. There will be approximately 95,000 sq. ft. of exhibition space in the main auditorium.

The roof of the great auditorium is suspended by great trusses with a span of 350 ft. and a maximum height above the floor of 130 ft. There are no columns to break the view, and the balconies, which project out 22 ft. from the side walls, are 15 ft. above the floor. A series of rooms on the balcony level are available for auxiliary exhibits or for committee or meeting rooms. The great ballroom, which is located at the balcony level across the seaward end of the building, is expected to be one of the most magnificent public rooms in the country. It is to be superbly decorated, and will open out onto a loggia overlooking the boardwalk, the plaza and the ocean.

Other features of the building include the largest stage in the world, two great bath houses, the world's biggest pipe organ, freight and passenger elevators, a complete heating and ventilating system, and everything that modern science can provide for the comfort and convenience of exhibitors and visitors.

As this issue of the N. E. L. A. Bulletin goes to press approximately as many applications for space in the Exhibition have been received as there were exhibitors at last year's electrical show. Even though there is more room available in this new auditorium, about thirteen per cent more available space than last year, there is every indication that the late applications for room will form a waiting list such has occurred at most of the exhibitions sponsored by the N. E. L. A. at its annual conventions.

More elaborate preparations are being made for the handling of general and section meetings than have prevailed in former years. The committees that have these arrangements in charge are confident that the programs will allow for more efficient handling and seating of the various groups and that the tentative programs and lists of speakers will be more of a drawing card for the entire industry.



FACTS and FIGURES

National Statistics of the Electric Light & Power Industry

SOME 380 companies are now returning regularly to the National Electric Light Association a monthly report of their operating data. These companies represent about 80 per cent of the electric light and power industry. The monthly returns from these 380 companies have been summarized and extended to cover 100 per cent of the entire business.

The form in which these data are presented has been drafted in accordance with the suggestions and cooperation of the Statistics Committee of the Accounting National Section.

The cordial cooperation of the reporting companies has made possible the inauguration of monthly statistical data for the electric light and power industry by the N. E. L. A.

The timeliness of this current statistical information constitutes the essence of its value to the industry and to the public which it serves. In order that the electric light and power industry may obtain the full benefits of this service, it is again urged upon all the reporting companies to expedite their returns so that the reports will be received at N. E. L. A. Headquarters within thirty days and the present lag of three months may progressively be cut down.

NATIONAL STATISTICS
of the
Electric Light and Power Industry
Statistical Department—National Electric Light Association

	1928	(See Note)	Per Cent Increase
Final Data for Month of OCTOBER			
Monthly Data			
*Kw-hr. generated plus kw-hr. received from other sources	7,696,987,000‡	....	....
*Generating capacity (kw.)	(not yet available)	....	....
Total number of customers	23,071,000	....	....
Number of farms served (wired homes.)	130,981†	....	....
Number of domestic customers served	18,774,000	....	....
Sales of Energy (kw-hr. sold)			
Farm service	89,003,000†	....	....
Domestic service	692,612,000	....	....
Commercial Service			
Small light and power (retail)	975,601,000	....	....
Large light and power (wholesale)	3,843,523,000	....	....
Railways and railroads (motive power)	412,419,000	....	....
Other sales to ultimate consumers	182,829,000	....	....
Total sales of energy to ultimate consumers	6,195,987,000	....	....
Total revenue (including approximately $9,000.000 from sale of resale energy and miscellaneous)	$165,376,000	....	....
Data for Twelve Months Ending	Not available until December, 1928, report forms are completely returned and summarized		
*Kw-hr. generated plus kw-hr. received from other sources			
% generated by water power			
Lbs. coal per kw-hr.			
Domestic service (residential use)			
Average annual consumption (kw-hr.)			
Average price per kw-hr.			
Preliminary Data for Month of	See *Note*		
Monthly			
Kw-hr. generated plus kw-hr. received from other sources			
Generating capacity (kw)			
Total number of customers			

*By courtesy of U. S. Geological Survey with deductions for plants not considered electric light and power enterprises.

†As reported by 110 companies only.

‡ Includes a small amount of energy generated for use in electric and other departments of companies.

Note: Comparable data for the corresponding month of the preceding year will not be available until the January, 1929, report forms have been received and summarized.

SURGES AND FLASH-OVERS

By Fred W. Herbert

Director, Service Department, NELA

A news item says a boy of five has the brain of an electrical engineer. The name of the engineer was not given.

* * * *

"The best safety device is located just above your ears. Use it."—*Service News.*

* * * *

There are some things which you alone can do for yourself. You scratch yourself because you are the only one who knows where you itch.

* * * *

A college student, asked by the professor exactly what electricity is, replied, "I did know, but I have forgotten." What a tragedy that the only man who ever knew exactly what electricity is has forgotten.

* * * *

If the new calendar of thirteen months becomes effective, it means one more monthly installment in a year.

* * * *

Honest advertising helps to make a business well known, and dependable service helps to make a business favorably known.

* * * *

A spider sucks poison from a rose and a bee sucks honey from the same sweet rose. It all depends on the sucker.

* * * *

How to cooperate is a big lesson which we must all learn sooner or later.

* * * *

There is a new electrical device which actually signs checks, and in a manner that forgery is practically impossible. What we want now is a device to keep the bank balance always equal to the checks drawn.

* * * *

A Pennsylvania statute provides in effect that all the stockholders of a corporation-owned drug store must be licensed pharmacists. This knocks out Customer Ownership.

* * * *

The life of poles in construction is lengthened by proper treatment. This should apply also in the human equation.

* * * *

If you are now only a little pebble in this life, try being a little bo(u)lder.

* * * *

Westinghouse Electric and Manufacturing Company advertise, "The electric range that gets meals all by itself." Bachelors please take notice.

* * * *

Many a good resolution is broken by simply dropping it.

* * * *

"It ain't the individual
Nor the Army as a whole,
But the everlastin' team work
Of every bloomin' soul."
—Kipling.

GEOGRAPHIC DIVISIONS and STATE ASSOCIATIONS

Empire State Association Meeting

THE electric section of the Empire State Gas and Electric Association met in New York City Jan. 10-11 with more than a hundred delegates from the State in attendance.

M. S. Sloan of the New York City companies discussed the benefits of section meetings.

Following his address a report upon automatic frequency control was read by G. A. Powell, chairman of the operating committee. H. E. Warren, president Warren Telechron Company, described the application of the telechron motor with master pendulum timer for the control of frequency, saying that with it an accuracy within one second per day was common and that it was possible to get an accuracy of one second in ten days. Such accuracies when used in conjunction with the frequency meters which have an accuracy of one-fiftieth of a cycle give virtually a constant frequency. Aerial power cables were discussed in the report of the overhead systems committee (J. F. Werner chairman). Colonel Stedman Hanks, president American Airport Corporation, spoke on the need of electrical power for airport lighting, beacon lighting and warning lights.

A report on vibration of overhead conductors, presented by the transmission lines committee (S. H. Abbey chairman), was the first item in the afternoon session. The radio co-ordination committee (W. L. Wenzel chairman) reported on the generation of radio interference, explaining clearly the causes of many radio disturbances. The discussion ranged around local difficulties, most of which had been corrected, and there was agreement that only about 17 per cent of all complaints investigated can be charged to electric utility companies' systems.

F. G. Schramm, chairman underground systems committee, reported on applications of parkway cable, stressing the fact that laying of cable unprotected by duct lines may cause trouble through workmen breaking these lines or the cable. Such interruptions are difficult to locate, he said, particularly in the case of parkway cable used for street lighting.

The report of the hydraulic power committee (Byron E. White chairman), presented on the second day, covered the relation of rainfall to run-off. It was well prepared, as were the reports of the apparatus and rural lines committees. The paper on rural lines construction, by A. W. Underhill, showed fruitful results from many hours' research.

In an able address Charles S. Ruffner, president of the association, stressed the good to be obtained from a free interchange of ideas.

V. J. F. Brain, New York Edison Company, was elected chairman of the managing committee for the ensuing year and S. H. Abbey, Northern New York Utilities, Inc., vice-chairman.

Rocky Mountain Division Committee Conference

By O. A. WELLER

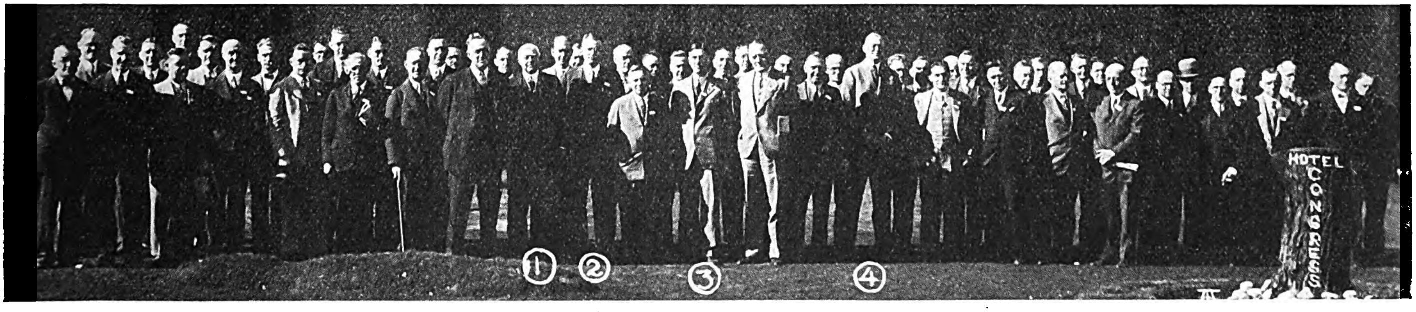
ASSOCIATION committees organized within the Rocky Mountain Division covering the states of Colorado, Wyoming and New Mexico met at the Congress Hotel, Pueblo, Colo., on January 25 and 26 for their annual discussion of utility problems. The scheme of these meetings is to have all committees represented as far as possible and to discuss the principal problems that have been presented to the various sections and committees. Eighty-five company managers, executives, engineers, accountants, commercial men and others were in attendance.

For the second time our program was set up as a series of questions. Thus under each established line of committee research two or three points were listed on the program not as statements but as questions. This listing of questions serves the dual purpose of providing specific points for profitable discussion and also of causing those present to think of other phases of their work which they desire to secure information upon. The question method of drafting programs has been well justified and very largely used by a number of national associations, particularly the American Management Association.

Growing out of this Committee Conference were a number of concrete suggestions and recommendations. Many of these had to do with commercial installations of load building equipment. Several of our larger companies have standardized on their methods of wiring for electric ranges, arriving at a cost of $27.50 for such installations. Subjects which received much attention were the best methods of placing utility securities, use of the NELA Handbook. present legislative problems both local and national, features of design of the proposed Boulder Dam Hydro Plant, methods of creating a commercial consciousness in the minds of engineers, accountants and other employees to the end that the company's load may be increased.

The value of these general discussion meetings is becoming more and more apparent where chief executives, accountants and engineers contribute from their own experiences for the benefit of others. An enjoyable evening was spent in an inspection trip through the steel mills of the Colorado Fuel and Iron Company in West Pueblo. At this plant a $10,000,000 electrical installation of prime movers, individual drive motors and controls has recently been completed.

The closing feature of this Conference was a social event in the form of a dinner-dance at the Pueblo Golf Club with the Southern Colorado Power Company and the Pueblo Gas and Fuel Company as hosts.



Officers and Members Rocky Mountain Utility Associations

1. C. N. Stannard, Public Service Co. of Colo., Denver; President, Rocky Mountain Division.
2. W. D. Johnston, Mountain States Power Co., Casper, Wyoming; President-Elect Rocky Mountain Division.
3. O. A. Weller, Public Service Co. of Colo., Denver; Secretary, Rocky Mountain Division and Secretary Colorado Utilities Association.
4. V. L. Board, Public Service Co. of Colo., Denver; President-Elect, Colorado Utilities Association.

Kentucky Association Convention

THREE hundred delegates represented the 46 member companies of the Kentucky Association of Public Utilities at its twelfth annual meeting at Louisville, January 15 and 16, and 426 gathered at the banquet on Jan. 15. The program as carried through ranged around general utility topics, embracing the different classes of companies, but electricity on the farm was the outstanding subject of discussion.

In his presidential address Samuel Riddle described the work of a committee appointed under a resolution of the 1928 Legislature to make a survey of the utilities of the state and suggest remedial legislation if needed. A meeting of this committee was held in November at Louisville, attended by utility representatives, who offered full cooperation and are now compiling information for the use of the committee. A news service bulletin for the use of the press was abandoned early last year, Mr. Riddle said, and Robert Montgomery of the Louisville Gas & Electric Company was made chairman of a special committee to give out publicity.

On Tuesday afternoon Keen Johnson, editor of the Richmond (Ky.) *Register*, spoke on "The Industrial Future of Kentucky," telling of scientific developments aided by electricity. Dean Thomas P. Cooper, of the Agricultural College, University of Kentucky, discussed "What Electricity Means to the Farmer," and G. M. Miller, Louisville Gas & Electric Company, took as his subject "Neon Lighting."

J. F. Owens, vice-president of the National Electric Light Association, was guest of honor at the banquet and spoke on public relations. James P. Barnes, Louisville Railway Company, was toastmaster.

On Wednesday morning N. M. Argabrite, vice-president American Gas & Electric Company, New York, read a paper on "A Fundamental Rate Basis." Prof. Ralph E. Hill, University of Louisville, spoke on education and higher standards of living as developers of the public utilities.

James B. Davis, president Federal Land Bank, Louisville, discussed "Progressive Agriculture with the Aid of the Utilities"; J. H. Harmon, Kentucky Utilities Company, stressed the influence of safety work on industry, and Mrs. B. K. Yewell, chairman of the women's committee, spoke on "Selling the Electric Idea to Women."

Officers elected are: President, W. H. Horton, general manager Cincinnati, Newport & Covington Railway Company; first vice-president, L. B. Herrington, president Kentucky Utilities Company, Louisville; second vice-president, M. C. Funk, Kentucky & West Virginia Power Company, Ashland, Ky.; secretary, E. F. Kelley.

Tom C. Polk New Secretary-Treasurer, Great Lakes Division

TOM C. POLK, who recently was elected secretary and treasurer of the Great Lakes Division, National Electric Light Association, took office on Feb. 1. He succeeds the late R. V. Prather. His headquarters are in Chicago.

Mr. Polk has been director of public relations of the Central Indiana Power group the last five years. The group serves 170 communities in Indiana.

He is serving his second term as president of the Indianapolis Lions Club and is a deputy governor of the Indiana Lions group. He is a director of the Indianapolis convention bureau and the American Peace Society, Indiana Committee. He also is a member of the Indianapolis Athletic Club and the Columbia Club.

SPECIAL COMMITTEES

Increased Voltage at the Point of Utilization*

SOMEONE evidently impressed with traffic congestion has remarked that the invention of the bumper was the one thing that made automobile travel possible. In like vein one might say that the invention of the multiple-outlet receptacle is the one thing that makes possible the use of much modern electrical equipment.

For many years building wiring has been notoriously inadequate with respect to provisions for future growth. Usually it has been inadequate even to the immediate requirements both as to amount of copper and number of outlets. The demand for more and better lighting and the increasing use of electrical appliances have imposed demands for additional outlets and have increased the load to an extent which frequently occasions serious potential drop between service entrances and outlets.

Not infrequently amateurly installed wiring, sometimes constructed from Five-and-Ten-Cent-Store parts, carries the current to remote corners of inadequately wired rooms. Festooned artfully around the walls or ceilings, or concealed craftily back of davenports, pianos, file cabinets, and under rugs, the extension cord brings the current to any spot desired. It usually compels some of the original outlets to do the work which should be done by two or three outlets. Whatever may be said of the desirability of such extensions of a wiring system there is no question that in many installations such extensions have added materially to the load, rendering wiring which originally was meager now quite inadequate to meet modern requirements. Even where no additional wiring has been added the tendency with passing years is to use more and larger lamps and to add motor-driven and heating appliances which over-tax the wiring system.

There are three principal consequences of these conditions which are unsatisfactory. First, there is a persistent loss of energy in the inadequate wiring. This can be corrected only by the use of more copper in the installation. Second, when large lamps or motors or heating devices are placed in circuit or removed from circuit, there is likely to be an annoying flicker of lamps as a result of change in the potential drop. Here again, correction must be sought by adding copper to the wiring system. Third, the potential drop often brings the voltage at the lamps or appliances to a point below that for which they were intended with resultant loss of effectiveness in the translating device.

Surveys in buildings constructed five or ten years ago have shown that the voltage drop in interior wiring, measured from the service switch to the actual point of use at the lamp terminals, is likely to run to two or three times the value originally assumed. The lighting service especially suffers in such cases because incandescent lamps are particularly sensitive to voltage variations.

Under such conditions, it seems practicable to improve conditions somewhat by increasing the voltage maintained at service entrances to an amount which may be indicated by the facts regarding socket voltages or ascertained during principal hours of use. If, upon adequate survey of socket voltages during hours of use, it be found that lamps are operated at say 112 volts during periods of greatest use when they should be operated at 115 volts, it would seem to be a fair question whether it would not be desirable to increase the potential at the service entrance in order to operate the lamps more nearly at their normal voltage. In such a case the illumination would be increased by about 8 per cent and the watts consumed would be increased by a little over 4 per cent.

In the last analysis it is the voltage actually delivered at the point of utilization that is really important to the service. If lamps and appliances are designed to operate at 115 volts they will render their best service when that voltage is applied.

The moral of this brief article is that if best results are to be sought it is important to know the facts concerning socket voltages in principal hours of use and to be guided by those facts in regulating voltages on distribution circuits for most effective service.

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*Article contributed by Lamp Committee, Mr. Frank W. Smith, chairman.

COMMERCIAL SECTION

Marshall E. Sampsell, *Chairman* C. E. Greenwood, *Commercial Director, N. E. L. A.*

Great Lakes Commercial Section Meeting

THE Commercial Section of the Great Lakes Division held its second meeting for the fiscal year 1928-29 at the Pfister Hotel in Milwaukee on Friday, Jan. 25. The meeting was very well attended, with a total attendance of 85.

At 9.30 in the morning all committees gathered together for reports and general discussion. This was followed at 10.30 by meetings of the individual committees.

The work of this division is proceeding very smoothly and the activities of the various committees for this year are most worthwhile.

Frank A. Coffin, sales manager of the Milwaukee Electric Railway & Light Company, addressed the gathering, following the luncheon, discussing the commercial activities of his company.

C. E. Greenwood, Commercial Director, N. E. L. A., attended the meeting and told of the work that headquarters is doing in connection with commercial matters. Mr. Greenwood also gave considerable assistance in connection with a proposed merchandise sales conference which, it is anticipated the Great Lakes Division will sponsor this spring.

The next meeting will be held in Detroit, Friday, April 5.

W. H. Sammis.

Promotion of Domestic Cooking Load

Previous to the Annual Convention of 1928, the Electric Range Committee produced a complete advertising and sales plan for promotion of the domestic cooking load.

The advertising broadsides were the products of the Manz Corporation, Chicago, and were prepared by the Range Committees of N. E. L. A. and N. E. M. A., through the Society for Electrical Development.

There has been a general reduction in the price of the advertising material contained in "The Plan to Sell Electric Cookery."

The average reduction in price is about 30 per cent, and it is anticipated that this will stimulate a much greater demand for these excellent mailing pieces.

Write for more information on special prices to C. E. Greenwood, Commercial Director, N. E. L. A., 420 Lexington Ave., New York, N. Y., or to the Society for Electrical Development, 420 Lexington Ave., New York, N. Y.

Make preparations now for the Spring drive on electric ranges.

Pennsylvania Electric Association Begins New Commercial Publication

VOLUME 1, Number 1 of *The KWH Merchant*, dated Jan. 1, 1929, has been mailed to the members of the Pennsylvania Electric Association. This is the first issue of the new monthly magazine sponsored by the Commercial Section of that association.

Attractively arranged and printed in eight pages, it is designed as a medium for the interchange of ideas, suggestions and plans relating to better load-building methods and other commercial phases of the utility business.

R. R. Electrification

Progress of Railroad Electrification During 1928

IN a review of the year 1928 in the electric railway field, W. D. Bearce of the railway engineering department, General Electric Company, says that the most important steam railroad electrification initiated was the Cleveland Union Terminals project, plans for which had been under way for several years. This electrification involves 17 route miles and will employ 3000-volt direct current with overhead catenary supply. There are now under construction at the Erie works of the General Electric Company for handling passenger trains of the New York Central and other roads in and out of this terminal 25 204-ton passenger locomotives, rated at approximately 3000 hp.

The completed electrification of the Boston, Revere Beach & Lynn narrow-gage railroad is also described.

Both locomotives and car equipment have been installed on the Pennsylvania Railroad. This equipment includes motors and control for four 200-ton locomotives built by the railroad company for operation at the New York Terminal and 30 single-phase motorcar equipments for the new Wilmington and Westchester divisions.

Delivery has been made during the year of additional passenger locomotives to the Paulista Railway in Brazil, bringing the total number of the heavy 150-ton type up to five units and the total number of all General Electric locomotives to 26 units. Two 260-ton locomotives similar to those installed last year have been placed in service by the Great Northern Railway on the electric zone through the Cascades, in Washington State. Operation through the new 7¾-mile Cascade tunnel began on Dec. 28. Two 150-ton, 3000-volt direct-current locomotives are under construction for the Mexican Railway.

Training Employees

(*Continued from page* 104)

program was about one-half of one per cent of the employee's yearly salary; and if it is worth paying to keep an employee on the job, surely that sum is worth spending to insure his doing the right kind of a job.

We have invested millions in physical equipment. In the aggregate we have spent millions in advertising and in good-will gestures of one kind or another. We have boasted of the high caliber of our service and its low cost. Then a customer walks through our front door to be served. He meets an employee, loyal but untrained, and in the course of that loosely handled interview something happens that displeases him—forthwith he ignores the rate reductions we have brought about, the advertising we have done to inform him of plans for future reductions and improved service, the millions we have invested to serve him, and when he walks out the front door takes with him an opinion of our company and its service based squarely upon the personality of the employee that served him. Surely that employee is worthy of careful training.

CORRESPONDENCE

To the Editor:

The Pennsylvania Railroad is to be complimented on their announcement that they were going to purchase power.

The great public utility companies have spent millions on research and evolution of the great so-called superpower stations, and through their resources, can produce power cheaper than any other set of men in the world.

Railroads building their own large power stations more or less go into competition with the public utility interests, as happened in Boston a great many years ago when the Boston Elevated built a power station within a thousand or two thousand feet of the Boston Edison Station, which really amounts to an economic loss.

Therefore, I state in as clear English as possible, that the railroads of America, in electrifying, should first, last and all the while, buy their power of the great public utilities.

It is also known by all thinking men that the public utility companies are quoting prices commensurate with the purchase of power, and last of all, but not least, the diversity of the load on a public utility as compared with the load factor of a railroad, also gives a great additional gain.

John A. Stevens.

Lowell, Mass.

WOMEN'S COMMITTEE

Miss Sophia Malicki, *Chairman* Miss Isabell Davie, *Secretary*

News Letter

By Mrs. Thelma Van Ness

Two short courses of interest to women in the electrical industry, sponsored by women's committees of the N.E.L.A., will be offered in March.

The Women's Committee, Southwestern Geographic Division, will for the second time sponsor a Short Course in Electrical Household Equipment at the Oklahoma A. & M. College, Stillwater, Okla. It will be held March 18-23 inclusive. Additional information will be sent upon request to Miss Florence Shertz, Home Economics Department, Oklahoma A. & M. College, Stillwater, Okla., or Miss Julie Pailet, New Orleans Public Service Co., New Orleans, La., who is chairman, Women's Committee, Southwestern Geographic Division.

A short course for women interested in the electrical and gas industries will be conducted under the auspices of the School of Home Economics at Purdue University, Lafayette, Ind., the week of March 24. Additional information concerning the program can be secured from the school or from the Indiana Public Utilities Association, 1548 Consolidated Building, Indianapolis, Ind.

* * *

The fall course in Home Lighting, which the National Lamp Works offers through the Nela School of Lighting, was held Nov. 12-17 last.

For the first time in the four years that Home Lighting courses have been held, there were registered an unusually large number of men. As the program had been planned especially to prepare women for the residential lighting field, the presence of so many men was a little disconcerting. However, it worked out better than was first anticipated, for several of the men who attended were heads of lighting departments which are about to take on women to cover the residential field.

There were thirty-four registrants; eighteen women and sixteen men.

In planning the program, a great deal of thought was given to insure that it should contain not only the fundamental principles of residential lighting, but also as many practical suggestions as possible for future activities.

In order that this material should be of maximum value, founded on experience, a number of women who are outstanding in their work in this field were invited to be on the program. These were: Miss Marie Tudor, Home Service Director, Interstate Public Service Co., Indianapolis, Ind.; Mrs. Frances Rosenberg, Home Lighting Engineer, Commonwealth Edison Co., Chicago, Ill.; Mrs. Ella Smethers, Director of Home Service, Ohio Public Service Co., Cleveland, and Miss Isabell Davie, Secretary, Women's Committee, N.E.L.A. Rounding out and tying in the whole week's endeavor came the address on "Women's Influence in the Residential Field" by Mrs. Bernice Bowser, editor of the central station residential magazine, *Beauty at Home*.

One very outstanding feature of the week was an evening spent at the new home of Dr. and Mrs. Luckiesh, which is of especial interest to lighting students because of the lovely lighting effects. The house, which has ten rooms, has 177 sockets which carry 6500 watts.

* * *

The October and November meetings of the East Texas Women's Committee of the Southwestern Gas & Electric Co. were held in the lobby of the Marshall office. The luncheon for each meeting was prepared by the members of the committee in electric cookers.

To these meetings a number of outside guests were invited: club women, newspaper men and women, and people of prominence in local civic affairs. Several department heads from the company were also guests. The general subjects of the meetings were "Public Contact" and "Public Utility Economics."

* * *

Miss Alice Schuetze, Chairman, Women's Committee, Central Power & Light Co., was invited by the Agricultural and Mechanical College of Texas to take part in its Farmers' Short Course. She gave five lectures on lighting the farm home and also assisted in other classes. Books on the making of lamp shades were distributed.

Miss Schuetze was asked to give lectures in future courses.

Home demonstration agents, who have important parts in the farm short courses, expressed the need for assistance of utilities in these programs and in their general educational work with farm women.

* * *

The final results of the lamp campaign carried on by the Southern Illinois group of the Illinois Power & Light Corp., East St. Louis, Ill., show that 150 girls sold 102.39 per cent of their quota, or 25,143 lamps—value $6,074.12, wattage, 1,431,475. Miss Angie L. Watts—what an appropriate name!—is chairman of the Women's Committee in Illinois, and her charts, posters, etc., were very effective in sustaining enthusiasm throughout this campaign.

* * *

Miss Julie Pailet, chairman of the Southwestern Division Women's Committee, tells us about an Efficiency Contest in which each Women's Committee reports its activities for the month, each different piece of work, including meetings, stock sales, talks, etc., counting a certain number of points. This contest is in effect from October, 1928, to March, 1929.

* * *

In the Mazda Lamp campaign of the Jackson District, Consumers Power Co., Michigan, one of the Women's Committee girls, Miss Marjorie M. Wiltse, carried off first honors. According to the *Office Illuminator*, this group is in the midst of a playlet writing contest.

* * *

The Women's Committee of the Northwestern Electric Co. at Portland, Ore., originated, and until a few months ago edited, a company publication known as *Northwestern Light*, at which time an editor was appointed to relieve the girls.

* * *

Through the efforts of Mrs. A. W. Angell, Chairman of the Women's Committee of the Northwestern Electric Co., Portland, Ore., a luncheon was prepared and served to a group of ninety-six women by the range demonstrator of that company. A Parent-Teacher group of over two hundred was similarly served and after each of these luncheons a demonstration of the electric range used was given.

* * *

At a recent meeting in Tennessee, the girls of the Tennessee Electric Power Co. were given questionnaires consisting of 14 questions pertaining to operating costs of various appliances, home lighting, etc., and a prize was offered to the girls answering the largest number of questions correctly. Mrs. C. E. Gross was the winner.

* * *

One of our Women's Committee girls, Ruth E. Creveling, is the editor of *News-Meter*, the San Diego, Cal., Consolidated Gas & Electric Co. magazine, a very interesting medium for showing the activities of the San Diego organization.

* * *

On October 30, the local chairmen and representatives of Ohio Women's Committees met with Mrs. Ella Smethers, Ohio Chairman, and Miss Esther Rockey in Mansfield, Ohio, and went over the work for the coming year. In the afternoon Miss Alice McCarren, acting as hostess for the Westinghouse Electric & Manufacturing Co., conducted the women present through the Mansfield plant of that company. At the end of the trip, the girls enjoyed an interesting demonstration of the "Televox" or "Electric Maid."

* * *

The Central Illinois Public Service Co. reports 35 demonstrations of electric cookery made by company women in different towns throughout the territory during two months to 832 women.

* * *

A two month's report from the Great Lakes Division shows that 98 addresses were made to outside groups by girls of the Central Illinois Public Service Co. to a grand total of 6209 persons.

* * *

The Girls' Safety Team of the Wisconsin Public Service Co. has appeared before several outside organizations.

* * *

The Women's Committee of the Rochester Gas & Electric Corp., New York, holds two meetings a month. One-half of the personnel attends one and the other half are present at the duplicate meeting.

* * *

The Kansas Gas & Electric Co., Pittsburg, Kan., district Women's Committee and a few employees' wives are receiving instruction in First Aid and Safety First Work from William Hislop, Superintendent of the Mine Rescue Station, at the Kansas State Teachers College. The class meets every Tuesday and Friday evening for four weeks. Their aim is for 100 per cent of their committee to pass a satisfactory test on the Prone Pressure Method of Resuscitation and First Aid Emergency methods and thereby receive a diploma. In Topeka more than a fourth of the girls—divided into four teams—are running a race to see who can learn "Safety First—and Best." A prize will be given the winner.

* * *

According to *Woco Sayso*, published by the Women's Committee of the Denver District, Public Service Co. of Colorado, these girls have decided to divide their group into nine smaller groups, one for each of the nine meetings of the year. These Squads, as they are called, are numbered by chance and then drawn for date of officiating.

* * *

Miss Florence Donkin, Canadian Geographic Division Chairman, reports that the Women's Committee at Montreal holds monthly luncheon meetings with an attendance of approximately 170 girls.

* * *

Miss Margaret Kingsley, assistant to Dr. Mary E. Pennington of the Household Refrigeration Bureau, New York, spoke before the Springfield, Ill., Women's Club recently on Home Refrigeration. Miss Kingsley's appearance was arranged by the Central Illinois Public Service Co., Springfield. Preceding the meeting she was guest of honor at a luncheon given by women employees of the company.

* * *

Announcement is made of the appointment of Miss Iva B. Sellers, Pennsylvania Electric Co., Johnstown, Pa., as a member of the National Women's Committee. Miss Sellers succeeds Miss Clara Zillessen, Philadelphia Electric Co., Philadelphia, Pa., resigned, who has held the Eastern Division Chairmanship for a number of years.

* * *

"Cooking with small electrical appliances," is the seventh of the "More Power to the Home!" series of booklets presenting the uses of electricity in the home, prepared by the Women's Committee, is available for distribution. Price, 1-9 copies, each 13c.; 10 or more copies, each 12c. Orders should be sent direct to National Electric Light Association, 420 Lexington Avenue, New York.—(*advt.*)

MAGAZINE ARTICLES

Below is a list of articles which appeared in various magazines recently that are especially interesting to Women's Committee members:

- *Good Housekeeping*—January.
  - Testing at the New Institute —George W. Alder.
  - Christmas Gift Insurance—B. Lawson Miller.
- *McCall's Magazine*—January.
  - Wash Days Are Easy Days—Anne Pierce.
  - Laundering Delicate Fabrics.
- *Woman's Home Companion*—January.
  - Kitchenettes in Action—Alice Bradley.
- *People's Home Journal*—January.
  - Better Homes in America—Irene H. Burnham.
- *Modern Priscilla*—January.
  - The January News Letter—Della T. Lutes.
  - Convenience and Beauty in the Kitchen—Greta Gray.
- *Better Homes and Gardens*—January.
  - Modern Lamps Lose Bows and Furbelows—Athena Robbins.
- *The Farmer's Wife*—January.
  - Beating Ma Out of a Job—Richard A. Perry.
- *Capper's Farmer*—January.
  - Electric Refrigeration Ended Deer's Trips to Town for Ice—S. M. Ballard.

RELATED and other ORGANIZATIONS

Mid-Winter Conference of Electrical Leagues

In the Mid-Winter Conference of electrical leagues, held in Cleveland Jan. 7-9, under the joint auspices of The Society for Electrical Development and the League Council, there was a new note of definiteness about the several goals of cooperative effort with which league managers are concerned in their continuous task of aligning and keeping aligned the local purposes of a many-sided industry. This definitive character of the congress was all the more impressive in view of the fact that the sessions brought out a record enrollment of 101 conferees representing 39 leagues and central stations, manufacturers, jobbers, contractors and the business press.

First, in getting a focus on league policy with respect to its character as a local industry spokesman, there was developed a definite attitude that the old axiom of "Live and let live" should be altered to read: "Live and *help* live!" This sentiment was crystallized by extended discussion of the credit and selling problems apropos of the small contractor-dealer.

Secondly, and also with respect to policy, there was an unrecorded consensus among the conferees that in league organization there must be the conception among the membership that "cooperation is doing something with some one else that you yourself may not want to do," this epigram being the invention of G. E. Miller, sales manager of the Cleveland Electric Illuminating Company, who made the address of welcome.

Thirdly, and in connection with the two foregoing principles of league organization, there must be a definite plan of local education in the matter of good trade practice as the cornerstone of every league structure. It was emphasized that without an appreciation of this fundamental element of the machine on the part of the membership, that cooperative efforts marketwise would meet with only indifferent reception and spasmodic success.

The high spot of the conference was the formal presentation of the Franklin Red Seal Plan made to the secretary-managers during their visit to Nela Park.

In his introductory remarks, Ward Harrison, chief illuminating engineer of Nela Park, pointed out that the specifications represented, if not the "last" word in industrial lighting science, at least the "latest." He also emphasized that the Franklin Plan was no hastily conceived effort but one that was truly representative of the best practice in illumination and market promotion, it having had the extended attention of the industry's experts in these two fields of activity.

Over and above this, there was to be remembered the fact that the Franklin Plan was not an untried venture, since it has been in operation in the Chicago territory for two years under the sponsorship of the Electric Association of Chicago, the originator of the idea. Successful experiences in the field were dwelt upon by Mr. Corcoran and actual demonstration of how to apply the specifications to a given industrial or commercial job was presented by Ralph Raymond, lighting specialist of the Electric Association of Chicago.

Industrial Conference Board Organizes Statisticians

THE National Industrial Conference Board of New York City has recently organized a permanent conference of statisticians in industry which meets regularly once a month. It is composed of a group of statisticians and economists of industrial and trade organizations representing, at present, about 30 of the leading industries of the country, including railroad transportation, building construction, and important branches of wholesale and retail distribution. The public utilities of the country are represented by statisticians from the National Electric Light Association, the American Electric Railway Association, the American Gas Association, and the American Telephone and Telegraph Company.

The Conference has been established for the purpose of extending and improving the statistical analyses and interpretation of current business conditions. It is felt that in this way industry and trade will be furnished with more prompt and authoritative information of the current business situation, based upon careful study of available business statistics and their evaluation in the light of the practical experience of industry itself.

Sloan Tells of Merchandising Plans at N. Y. Electrical League Luncheon

THE selling of electrical appliances to the public was begun by the New York Edison Company on Jan. 2. Full details of merchandising methods, however, have not yet been worked out. Speaking before the New York Electrical League at luncheon on Jan. 9, President M. S. Sloan said:

"We intend in future to sell electrical appliances at the showrooms of the New York Edison Company just as they are being sold by other companies in the system. . . . The thought behind the old situation was that the utility was interested only in the use of energy by its customers and that by refraining from selling appliances itself it left equal opportunity and an open field to all venders. As a matter of fact, it didn't work out that way, and you know it didn't as well as I do. All dealers and all contractors did not get equal advantages from this practice, and I doubt whether the company's refraining from actual sales of appliances was of real benefit to anybody. . . .

"We shall not cut prices or do anything else, directly or indirectly, to place any contractor or dealer under unfair competition. We shall endeavor to stimulate this branch of our business by advertising as we do other branches of our business. I believe this advertising will be of such character as will result in sales of electrical merchandising not by us alone but also by others who carry such goods. If it does, we shall be glad to feel that our new course is of benefit and profit to others in the industry as well as to ourselves. Our interest as a public utility supplying electrical service is and always will remain primarily in the increased use of energy. Our efforts in merchandising of apparatus will be directed and shaped to that end. The more energy-using devices sold—whoever makes the sales—the more electricity will be used and the more value the public will get out of electric service."

At the Electrical League luncheon President Earl Whitehorne, Vice-Presidents T. H. Joseph, W. A. Kennedy and C. L. Law, Treasurer L. L. Strauss and Secretary D. T. Brown were reelected for 1929. L. A. Coleman, Edward De Forest, G. T. Dunklin, E. P. Prezzano and Grant Armor were elected as directors for three years, Mr. Armor's being the only new name.

Program for Midwest Power Conference

SIX general sessions, three luncheon meetings and a banquet and dance will make up the program of the Fourth Midwest Power Conference, to be held in Chicago from Feb. 12 to Feb. 15. All meetings and sessions will be at the Palmer House, where a total of twenty papers will be presented.

On Tuesday the conference will begin with a "get-together" luncheon. Wednesday morning will be devoted to metallurgical and chemical problems, with three papers by authorities in this field. The afternoon session, controlled by members of the American Institute of Electrical Engineers, will cover electrical engineering subjects. On Wednesday evening the banquet and dance will immediately follow a notable address. On Thursday morning problems in heating, ventilating and refrigeration will be covered, and in the afternoon three papers under the general classification of power-plant operation will be given. The Friday morning session will be devoted to power-plant economics, with three papers by members of the American Society of Mechanical Engineers. The conference will close at noon on that day, giving engineers an opportunity of visiting the Power Exposition, which will be held during the same week in Chicago. Visiting engineers may avail themselves of the opportunity to visit any one of a list of fifty or more modern industrial and utility plants in the Chicago area which will be open for their inspection.

Picked up from

ELECTRICAL NEWS ITEMS

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THE most interesting item to be found in the January output of Electrical News Items is the monthly story on the demand for power as an index to manufacturing activity and general prosperity. Proceeding on the theory that general business activity is synonymous with the activity of factory machinery, the Statistical Department of the National Electric Light Association has, after two years of investigation, reached the conclusion that the amount of electric power used in any given month or season, when compared with the demand for the same period in previous years, will indicate clearly the state of the country's industrial activity.

The figures for the month of November, 1928, tend to show that business was about 6 per cent better than it was at the same time in 1927, but that it receded 1 per cent from the extraordinarily high level of October. The total output of electricity showed an increase of 13 per cent over November, 1927, but part of this was due to the normal growth of the light and power industry and part to the comparatively much greater activity of the mines, mills and commercial establishments of the country.

Electrical Energy Moves Three-fourths of All Machinery

"ELECTRICAL Energy, privately generated and purchased, today is the power running practically three-quarters of the nation's installed machinery," says Robert M. Davis, statistical editor of the McGraw-Hill Publishing Company, in an article in the Jan. 1 issue of *Power*. In his opinion, the trend is distinctly toward a further proportionate increase in the amount of electrically driven machinery as against all other types of power.

Production in 1928

MORE electrical energy for homes, factories, street lighting, and the thousands of uses to which it is applied, was produced by the electric light and power industry in this country during the first eleven months of 1928 than was developed during the entire twelve months of 1927. The production of 74,500,000,000 kilowatt hours during those eleven months of 1928 is compared with the total 1927 production of 74,335,070,000 kilowatt hours.

That this increase in the output of electrical energy is a constantly increasing process is evident from the output of 1926, when the total number of kilowatt hours produced was 67,775,000,000. More energy was made during the first ten months of 1928 than was produced during the entire year of 1926.

The Cost of Electric Service

ALTHOUGH electrical apparatus and equipment now costs from 60 to 75 per cent more than in 1913, and wages and the cost of coal per ton are approximately 200 per cent greater, the average price for *all* electricity (light, power and traction) sold to the people of the United States was the same in 1928 as in 1913. If domestic rates for electric service had risen from 1913 to 1928 as much, proportionately, as the cost of living has increased, it would have involved an additional charge to the public of approximately $550,000,000 more in 1928 than the amount actually collected by the electric light and power industry.

Putting it another way, the average price for household electricity in 1928 was 6.75 cents per kilowatt-hour as against 8.7 cents in 1913. On the other hand, the cost of living is still 70 per cent above 1913. If the cost of domestic service had increased at the same rate as the cost of living, it would now stand at 14.75 cents a kilowatt-hour. It has thus decreased—in terms of cost of living—by 54 per cent, and now stands at 46 per cent of the 1913 value.

Interconnected Systems Continue to Replace Isolated Plants

REMARKABLE results in the replacement of isolated electric power plants by interconnected systems whose current is supplied by large, centralized plants, is shown by the United States Bureau of the Census summary of electric light and power plants in Kentucky.

In 1922, there were 111 individual commercial systems operating in that State. By 1927, this number had declined to 33, a shrinkage of 70 per cent. This tendency toward consolidation is described by the Census Bureau as follows: "The apparent decrease in the number of commercial establishments during the five-year period (representing the net result of a gain of 11 and a loss of 89), is chiefly a result of the centralization of ownership or control and the absorption of independent generating stations accompanying the extension of transmission lines."

Equally striking is the decrease in the number of municipal systems during these same five years. This has shrunk from 27, in 1922, to 8, in 1927, a similar decline of 70 per cent; and its causes are described by the Census as being "due to the abandonment of municipal generating stations and the acquisition of municipal distribution lines by commercial systems."

Even to the Grave

AND now municipal operation is to follow us even to the grave, if we allow ourselves to be informed by an article by Paul Blanshard, in a recent issue of *The Nation*. Mr. Blanshard wants the cities of the United States to establish municipal burial offices. These bureaus, he emphasizes, will enable us to take the final step more economically and will protect us from the "piratical levies of the private morticians."

"The development of municipal funeral bureaus in America," he states, "would be the sanest and most obvious answer to the problems of funeral costs, but there are few cities in America progressive enough to fight private ownership propaganda successfully."

It is appreciably cheaper, Mr. Blanshard points out, to be buried in Cologne or Vienna than it is in the United States. He cites instances of American undertakers preying on the sympathies of our poor people and charging them exorbitant prices for caskets and paraphernalia. Also, if all our dead were cremated, we would save at least 22,000 acres of land every year.

What Is Prosperity?

DISCUSSING the meaning of the word Prosperity in the January issue of *The Industrial Digest*, Jose Bornn, Jr., financial editor, says: "The fact is that prosperity, in the final analysis, is as much a reflection of the prevailing psychology as it is a tangible statistical entity. It is nothing more or less than a standard of living. For example, if we judge our present scale of production and living by our mode of life in pre-war years, we must conclude that we are prosperous beyond the wildest dreams of that time. In other words, we must have some perspective in order to determine what is 'normal.' We are entirely too close to present-day events—we actually cannot tell what 'normalcy' is in the light of today's psychology, and if we cannot define 'normalcy' how under the sun are we going to know whether we are really prosperous or not."

After calling attention to statements issued by the Statistical Research Department of the National Electric Light Association, which appear in *Electrical News Items*, Mr. Bornn notes that "the demand for industrial power serves as an unusually accurate index of conditions throughout American industry," and concludes as follows:

"What has all this to do with our original question: 'What is prosperity?' It would seem that the Statistical Department of the National Electric Light Association might have gone just a little further and philosophized a bit on this whole question of the relation of demand for electricity to prosperity—not the prosperity represented solely by business activity, but the prosperity represented by a 'state of mind.' After all, doesn't it represent a standard of living which is not even comparable with the standard of pre-war days? Doesn't it represent a demand for things in the home in the way of labor-saving devices operated by electricity such as oil burners, electric refrigerators, vacuum cleaners, washing machines, sewing machines, and what not? What would our grandmothers and grandfathers, or even our mothers and fathers have said if they could have seen a modern electrified home? What would the farmer of colonial times think if he could come back and see an electrified farm with electric lights, running water, electric feed grinding, milking, pumping and a thousand and one other chores being done by mechanical servants which, in his day, meant nothing but endless drudgery?

"And doesn't this steady increase in manufacturing, business, amusements, and general activities of all kinds represent nothing more or less than a steady demand for an increase, or, rather, an improvement, in standards of living? If the answer to these questions is 'yes,' then the increase in demand for electricity represents not only a statistical prosperity, but a psychological prosperity which, after all, may be the only real prosperity."

The "Age of White Coal" Not Yet With Us

ACCORDING to Professor W. O. Blanchard, writing in the *Scientific Monthly* for January, "the age of white coal and the age of oil, of which so much is heard, are not with us yet. All of the water power of the world developed to date (about 3 per cent of the total potential) is replacable by only about 116 million short tons of coal, a little more than the yearly output of the State of West Virginia, while all the world's potential petroleum production is equivalent to the combined coal output of but two States—West Virginia and Pennsylvania."

On the Occasion of a Ground Breaking

(*Continued from page* 84)

vice-president of the Philadelphia company. He always recognized his duty as trustee for all interests. Knowing this great man as we all did, will any man doubt that this station which bears his name is dedicated in the highest sense, as long as one brick rests on another, to honest public service and to fair dealing between man and man? In placing this dear name upon this station, we pledge ourselves and our successors for all time to honor it and never do anything to bring it into disrepute. Out of the James H. Reed station shall flow not only electric current but good will and good service in the highest sense.

WHAT OCCURRED LAST MONTH

Consolidations

The Buffalo, Niagara & Eastern Power Corp. has filed with the Public Service Commission of New York an application for permission to consolidate the various holdings of this company into one organization to be known as the Niagara Power Corp. It will exchange its securities for those of the Buffalo General Electric Co., the Niagara Falls Power Co., the Niagara, Lockport & Ontario Power Co., the Tonawanda Power Co., and subsidiaries.

* * *

The Keystone Public Service Co. of Pennsylvania has taken over the properties of the Citizens Light & Power Co. of Oil City, Pa., and the Titusville, Pa., Light & Power Co.

* * *

The Southern Public Utilities Co. of Charlotte, S. C., has purchased the South Carolina Gas & Electric Co., with headquarters at Spartanburg. The two companies are associated with the Duke Power Co.

* * *

Plans have been announced for unification in the New York State Electric Corp. of all of the properties of the Associated Gas & Electric system in New York, except those in Staten Island and Long Island, and those near Buffalo. With the merger of properties the New York State Electric Corp. will embrace 73 units which originally were independent.

* * *

On Jan. 2, coordination of the operations of the Interstate Public Service Co., subsidiaries of the Midland Utilities Co., and subsidiaries of the Central Indiana Power Co., through centralized supervisory management, was announced.

* * *

The Georgia Power Co. has purchased properties in Georgia of the Augusta-Aiken Railway & Electric Corp. and the Georgia-Carolina Power Co.

* * *

Assemblyman Post has introduced in the New York Assembly a resolution asking appointment of a committee for the purpose of investigating the subject of present and proposed mergers of electric companies. The resolution apparently is inspired by a rumor of a great merger on the Atlantic seaboard.

* * *

Colleges and Propaganda

The American Association of University Professors, at its closing session at Columbia University, on Jan. 1, decided against taking immediate action on a resolution which voiced condemnation of "under-cover efforts to utilize college teachers for propaganda purposes." The Association announced that its Committee on Ethics is following testimony presented at the Trade Commission's hearings and will made recommendations later.

* * *

Earnings of Public Utilities

Gross earnings of public utility companies in November, exclusive of telephone and telegraph companies, as reported to the Department of Commerce by 95 companies or systems, were $193,000,000, as compared with $186,000,000 in October, and $182,077,497 in November, 1927.

* * *

The Federal Trade Commission's Investigation

The application of the Federal Trade Commission for a court order requiring certain officers and employees of the Electric Bond & Share Co. to produce certain records and answer certain questions, came on for hearing on Jan. 8 in the United States District Court for the Southern District of New York. The hearing was postponed until Feb. 5. The Electric Bond & Share Co. filed an answer to the Commission's application.

* * *

On Jan. 10, L. C. Bradley, former director of the Alabama Public Utilities Information Bureau, testified before the Federal Trade Commission concerning activities of this Bureau during its existence, commencing in 1923, and ending in 1926. On Jan. 11, Mrs. John D. Sherman, former president of the General Federation of Women's Clubs, appearing as a voluntary witness, gave evidence concerning articles she had written and payments for them which she had received. George F. Oxley, of the N.E.L.A. was recalled to the stand in connection with payments for the articles.

* * *

On Jan. 16, H. C. Spurr and A. S. Hills testified concerning the finances of Public Utilities Reports, Inc., of Rochester, N. Y., and concerning the nature of the publication, saying that Public Utilities Reports are records of decisions bearing on public utilities and that the support for the publication, which operates at a loss, is supplied by the Utilities Publication Committee, on which the N.E.L.A. and the A.E.R.A. are represented. William H. Onken, Jr., senior editor of the *Electrical World*, was also a witness.

* * *

On Jan. 18, Paul S. Clapp, managing director of the N.E.L.A., and George F. Oxley, director, Department of Public Information, were witnesses at the hearing. Mr. Clapp told of support given by the N.E.L.A. to an experimental project in rural electrification conducted at an agricultural extension station at the University of Maryland. Mr. Clapp said that the University was not financially connected with the experimental project. Mr. Oxley told of a survey of the situation in Ontario which was conducted by the N.E.L.A.

On Jan. 16, the Federal Trade Commission announced that it had filed with the Senate its Tenth Interim Report on the utilities investigation.

* * *

On Jan. 18, Professor M. G. Glaeser of the University of Wisconsin, author of a textbook called "Outline of Public Utility Regulation," also appeared as a witness. He testified that the N.E.L.A. had no part in the financing of the publication of his textbook.

* * *

Exports of Electrical Equipment

The Department of Commerce announced that in November a new record since the war for one month's exports of electrical equipment was made, shipments amounting to $10,851,811, an increase of $789,607 over November, 1927.

* * *

Holding Companies

On Jan. 10, announcement was made of the formation by J. P. Morgan & Co., Drexel & Co., and Bonbright & Co., Inc., of the United Corporation, organized for the purpose of acquiring minority stock interests in the United Gas Improvement Co., the Public Service Corporation of New Jersey, and the Mohawk-Hudson Power Corp., held by the organizers and by the American Super Power Corp.

* * *

Hydro-Electric

Governor Roosevelt of New York, in his inaugural address, Jan. 1, and his first message to the Legislature on Jan. 2, pointed out the urgency of settling the water-power question in New York, expressing the hope that settlement will not be delayed by partisan dispute. He declared that title to the States water-power must rest forever in the people of the State and must not be alienated by long-term leases.

* * *

On Dec. 29, individuals and organizations protesting against the issuance of a license to permit development of Cumberland Falls, Ky., for power purposes, filed a brief with the Federal Power Commission. Among the protestants are the Camp Fire Club of America, the Izaak Walton League, the American Civic Association and the National Conference on State Parks.

* * *

Premier King of Canada has stated that there will be no immediate decision on the application of the Beauharnois Power Co. for a permit to commence operation on their power scheme on the St. Lawrence.

* * *

The Ontario Hydro Commission has decided to install a tenth and final unit of 65,000 hp. at its Queenston plant on the Niagara River. This will raise the capacity of the plant to 625,000 hp.

* * *

On Jan. 2 the American Minister at Ottawa, William B. Phillips, and the Prime Minister of Canada signed a convention providing for construction of remedial works in the Niagara River above the Falls. The convention provides for a temporary diversion of an additional amount of water on each side of the boundary not to exceed 20,000 cu. ft. per second, for the purpose of determining the efficacy of the remedial works.

* * *

The Central Maine Power Co., in a letter to stockholders dated Jan. 2, says that its hydro-electric plant now being built at Bingham will generate 100,000 hp. and will be the largest in New England.

* * *

On Jan. 5, the American Civil Association filed with the Federal Power Commission a brief opposing the proposed hydro-electric development at Cumberland Falls, Ky., on the ground that it is not of sufficient economic importance to offset the alleged injury to the scenery at the Falls.

* * *

The Provincial Government of British Columbia has approved plans of the West Kootenay Power Co. to develop 80,000 hp. on the Pend Oreille River on a point near the international boundary. Between 4 and 6 million dollars will be expended in the undertaking.

* * *

The Washington Electric Co. of Seattle has applied to the Federal Power Commission for a preliminary permit for a hydro-electric development on the Columbia River twelve miles below Wenatchee, Wash. The plan calls for an ultimate installation of 144,000 kw. An application for a license for a development on Salt River in Gila County, Ariz., has been filed with the Federal Power Commission by James Girand of Phoenix.

* * *

On Jan. 16, the United States Senate adopted a resolution, offered by Senator Nye, directing that all protests which have been received by the Federal Power Commission in opposition to leasing Cumberland Falls for power developments, be transmitted to the Senate.

* * *

On Jan. 19, Major Somervell announced that confidential reports of applications of three power companies for permits for preliminary surveys of the Potomac River for the purpose of hydro-electric developemnt had been transmitted to Major-General Jadwin, Chief of Army Engineers.

* * *

A dispatch from Vancouver, B. C., says that an application now before the Provincial Lands Department proposes to divert the waters of the Chilco River through the coast mountains to the sea, a project, which, if carried out, could develop up to 1,000,000 hp.

* * *

Investment in Utilities

A compilation of public utility financing during 1928, prepared by Pynchon & Co., shows that an additional $1,878,034,945 was invested in domestic power and light companies' securities, $1,000,000,000 of which was for refunding purposes; gross revenue was estimated to be $1,785,000,000, and rate reductions during the last six or seven years represent a saving of $500,000,000 to the public.

* * *

Muscle Shoals

On Dec. 22, President Coolidge transmitted to the House of Representatives a memorandum giving, with legal references, the history of the so-called "pocket veto." The memorandum was prepared by Attorney-General Sargent and called forth by the discussion which has arisen in connection with the "pocket vetoing" of the Norris Muscle Shoals bills. The Parliamentarian of the House, after reading the Attorney-General's communication, stated that the weight of the cases and precedents cited tend to indicate that a bill not signed within the ten days' limitation does not become law, irrespective of whether the ten days is after final adjournment of Congress or between sessions.

* * *

On Jan. 5, Senator McKellar introduced a bill to authorize the Secretary of War to operate the Muscle Shoals plant for power purposes only, selling the electricity to states and municipalities. The Senator proposed the bill, which is similar to the Norris resolution, as a temporary measure. Senator Norris objected to the bill on the ground that it would be useless to pass it until the Supreme Court has ruled on the test case involving the validity of "pocket vetoes."

* * *

On Jan. 5, Representative Almon of Alabama, after a call at the White House, said that President Coolidge desires that the present session of Congress dispose of the Muscle Shoals problem.

* * *

A Scripps-Howard dispatch from Washington says that the War Department is seeking a new and "more satisfactory" contract with the Alabama Power Company for Muscle Shoals power.

* * *

Representative Crisp of Georgia has introduced in the House a bill similar to the Muscle Shoals bill passed at the last session of Congress, but without the $30,000,000 Cove Creek Dam project.

* * *

On Jan. 21, the United States Supreme Court announced that it would hear and review a case involving the question of whether the word "adjournment" in the Federal Constitution refers only to a final adjournment of Congress or covers an adjournment of any session. The validity of the so-called "pocket veto" by the President of a measure passed at the first session of a Congress is involved in this case. The case referred to is that of the Okanogan and other tribes of Indians, but the principle involved is the same as that involved in the President's "pocket veto" of the Norris Muscle Shoals bill.

St. Lawrence Project

On Jan. 14, the United States Supreme Court handed down a decision in the case of the states of Wisconsin, Minnesota, Michigan, Ohio, New York and Pennsylvania, against the Sanitary District of Chicago in regard to the diversion of water from Lake Michigan. The court held that diversion for sanitary purposes or for purposes not in aid of navigation is unlawful. Chicago will be required to arrange other methods of disposal of its sewage than by diversion of water.

* * *

Railway Electrification

On Jan. 2, it was announced that the New York Central Railway is considering plans for electrifying its lines from New York to Buffalo from power to be generated by Niagara Falls.

* * *

Rates

The Durham, N. C., Public Service Co. is asking permission to decrease its rate for electrical current and at the same time to increase street car fares. The Columbus, Ohio, *Dispatch* says that the Columbus Railway Power & Light Co. is suggesting a similar course in Columbus.

* * *

The Georgia Power Co.'s new gas and electric schedules for Atlanta went into effect on Jan. 1. These involve a reduction to nine out of ten consumers, the total saving amounting to $500,000 a year.

* * *

The Public Service Co. of New Hampshire has announced new rate schedules, effective Jan. 1, involving a reduction of $60,000 for the Manchester, New Hampshire, and Lynn, Mass., districts.

* * *

The Queensboro Gas & Electric Co. of New York City has filed with the New York Public Service Commission a new schedule of electric rates calling for a reduction of $175,000 a year.

* * *

On Jan. 7, President M. S. Sloan of the New York Edison Co., testifying at the hearing before the New York Public Service Commission on the subject of master-metering service, said that rate-reductions aggregating approximately $14,000,000 will be made by the power companies comprising the Consolidated Gas Co.'s power system, if and when the sub-metering of electric current in the New York area is eliminated.

* * *

The Public Service Commission of Alabama has issued an order providing for reduced domestic service rates for consumers supplied by the Alabama Power Co. The schedule is lower than that for which the company recently asked approval, itself providing a reduction.

* * *

The Long Island Lighting Co. has asked approval of the New York Public Service Commission of a reduced schedule of rates for Nassau and Suffolk counties.

* * *

The Oklahoma Gas & Electric Co. announces another downward revision of rates for electric current in towns served by that company, beginning with bills rendered after Jan. 15.

* * *

Rate-Bases

The Interstate Commerce Commission and the St. Louis and O'Fallon Railway Co. have filed in the Supreme Court briefs supporting their positions in the celebrated O'Fallon valuation case, which involves the reproduction cost theory.

* * *

On Jan. 3, argument was begun in the Supreme Court at Washington in the St. Louis and O'Fallon Railway Case, in which the question of reproduction cost as a basis of valuation is involved.

* * *

Regulation

A decree entered in the Federal Court for Nebraska is to the effect that Nebraska villages no longer possess the power to regulate by ordinance the rates that public utilities serving them may charge. In 1920 Nebraska adopted a new constitution and this is held to have retained in the state all powers of regulation.

* * *

On Dec. 28, at a meeting of the American Economic Association in Chicago, Professor Ruggles of Harvard declared for federal regulation of interstate electric business through the establishment of federal regional commissions, which could control the activities of the utilities within what he called the twilight zones between state and federal jurisdictions.

* * *

Production of Electricity

The Geological Survey announces that production of electricity in the United States by public utility plants during November was 7,752,648,000 kw-hr., an increase of 13 per cent over November, 1927.

* * *

The St. Lawrence and Chicago's Diversion

On Jan. 17, Representative Rainey of Illinois issued a statement telling of unfavorable effects on Chicago and Illinois of the Supreme Court's recent decision against the diversion of Lake Michigan water by the Chicago Sanitary District. Mr. Rainey said that the decision "leaves $20,000,000 of state bonds high and dry" and will destroy a considerable water-power development at the outlet of the Chicago Ship Canal. He also declares that reduction of the diversion would be a blow to the proposed deep waterway to the Gulf. On Jan. 15, the Illinois delegation in Congress held a meeting in Washington with the idea of mapping out a plan of action. It is reported that they will press for Congressional legislation authorizing water-diversion for navigation.

* * *

Sub-Metering

The Public Service Commission of New Jersey recently sustained the contention of the Public Service Electric & Gas Co. of New Jersey in its refusal to install a master meter where submeters were also to be installed. The proposal of the New York Public Service Commission, made by the Consolidated Gas Co.'s group of electric companies, is being opposed by the Real Estate Board of New York, the Building Managers and Owners' Association and other real estate interests.

WITH OUR CONTEMPORARIES

One Reason, Anyway, Why They Invest

When you read that the Pennsylvania Railroad is to spend $100,000,000 for electrification, that the New York Central plans to spend as much, that New York Telephone has mapped out a program of $90,000,000 for construction this year, the largest in history, that American Telephone & Telegraph may spend around $100,000,000, that the light and power companies combined will spend billions for new construction, etc., you have a good explanation of why there has been such buying of stocks of the good electric companies.—*Wall Street Journal.*

Year of Mergers

The year 1928 has been characterized as "the year of mergers," but from present indications it will be light in comparison to the combinations to be put together in 1929. Conversations between no less than two dozen corporations engaged in various lies of business are under way. It has been found that little objection has been entered by the Federal Trade Commission to amalgamations when it can be proved that they will be beneficial to the corporations themselves and to the territories served. No less than five mergers, all of them of major size, probably will be announced early in the new year. The largest and most ambitious of them is an oil combination in which several independents will be put together.—New York *Times.*

Poor Tools for Good Workmen

While illuminating engineers have learned much about the physiological factors of their art, have investigated intensities, glare, distribution and backgrounds and have obtained lamps of excellent light characteristics, the fixtures in which they are placed are in general an abomination passing all understanding. The modern note is being stifled to attain uniformity; the best of the old is neglected.

One glance at a catalog of current offerings of home-lighting devices is sufficient to prove the point, for here are imitations of oil lamps set in an annulus of thin-rolled brass; horrible contortions of glass, a material which may be made incomparably lovely; dust catchers, eyesores, painted atrocities and hopeless relics of precedent. Electric light is as much a part of the modern home as the walls, doors, floors and windows. It is not something to be supplied by sticking a shining brass creation of glass and lamps in the middle of the room or on the walls like a picture.

Light should be built in. It should be supplied from invisible or unobtrusive sources. It should be a part of the design of the room. Decorative lighting, whether of floor or table lamps or ornamental figures, should be supplementary. This is a plea for the intelligent application of the knowledge at hand, waiting to be used, and of the facilities readily available. If the original Wright machine were used in airmail service today, it would be no less ridiculous than is the manufacture of lighting fixtures, particularly home devices, blindly supplying gewgaws that were, esthetically, none too satisfactory yesterday. Almost any new house or apartment is a horrible example of the things which may be done in meeting the builder's ideas of what is good enough.—*Electrical World.*

Water Power Sites and Electric Service

* * * We would not imply that water-power sites which are the property of the whole people should be allowed to fall into the hands of corporations without thoroughly adequate safeguards. But those who discuss the subject so often give the impression in their diatribes against corporate activity that the only alternative to loot and theft of national resources is government ownership and as much government operation as possible. The companies are painted so black that one might suppose that their sole object in developing power is to keep it away from public use. The erroneous impression is given that no safeguards exist against the greedy exploitation of water-power sites by selfish private interests.

It seems to us that if the electric and power interests of this country were becoming altogether too greedy, reckless and arrogant, as their opponents maintain, the signs of their guilt would be found in the service provided, not from the relatively smaller source of hydroelectric generation but from steam plants.* * *—*Saturday Evening Post.*

Coal and Waterpower

* * * It is as a source of power that both bituminous coal and anthracite must gain in value and importance with the shift from steam to electricity in general industry. This great hubbub in and out of politics over the subject of waterpower facilities offers a case in point. Yet if all the natural water power resources of North America were to be

at once developed to their full capacity—and this is not excluding Muscle Shoals, Niagara Falls, Boulder Dam and the rest of the proposed great Western projects—they could deliver only about 25 per cent of the electrical energy that will be required when present plans for the electrification of railways and farms are carried through. So then, entirely apart from Muscle Shoals' potentialities, it is conceivable that Alabama's well-nigh limitless reserves of soft coal ultimately will make of this commonwealth a central source of electric power for all the Southern States. In due course—and this, too, conceivably—power stations of immense capacity will be established at the mines, and they are likely to overshadow in economic importance, the greatest of the hydro-electric generating systems. Such centralization of facilities is possible with modern methods of long-distance electric power transmission. * * *

The coal industry in general has of late been going through one of the severest depressions in its history. Yet, in the opinion of those now directing spectacular revolutions in the technique of industrial production, coal is of increasing importance as a primary commodity and likely to figure much more largely in the economic scheme of the future than it has done in the past.—Birmingham, Ala., *News*.

Social Development of Small Communities and Electric Power

In spite of the steady increase in recent years in the amount of electricity produced in the United States, the number of generating stations in operation is 543 less than in 1920, according to the United States Geological Survey. Small stations of uncertain efficiency, are being replaced by large stations serving wide territories.

An electric company can adequately serve a single community only when it can reach a large closely settled population. In sparsely settled sections, the area served must be sufficiently large to overcome the smallness of population. To meet this need, pooling of power resources through interconnection of transmission lines, was innovated, and with outstanding success.

The result of this system is shown in an important agricultural state. Fifteen years ago a public utility investment company acquired nine plants in as many small towns and connected them into a unified system. From year to year more plants were added until the total, at present, is 140 in towns with average populations of 1800.

Previously, 46 of these towns had no electric service and many of them would have none today if they still were forced to depend on local plants. Of those which had electricity, 33 had only night service, and the remaining communities were served by small plants with limited facilities and at a high cost. Now all the communities receive continuous high-grade service.

Industrial decentralization, farm electrification and social development of small communities are to a great extent the result of uniform distribution of electricity.—San Francisco, Cal., *Mission Enterprise.*

REVIEWS OF N. E. L. A. AND RELATED PUBLICATIONS

Government (Political) Ownership and Operation and the Electric Light and Power Industry: N.E.L.A. Pub. No. 289-13, 530 pages. Price, $1.50 per copy. Substantial reductions for quantity orders.

THIS publication was prepared primarily for the information of member companies of the Association, but it is also intended for a more general distribution since it makes available in one place an imposing array of authentic facts, statements, views of leaders of thought and arguments showing the trend away from political ownership and operation of electric light and power companies. It is, fundamentally, a thesis in opposition to the intrusion of government into business.

It is obvious from the treatment of the material contained in this book that the editors have attempted to include only the most pertinent of the wealth of material that is at hand in propounding the above doctrine. The first chapter deals with the general history of some of the well-known ventures of municipal, state and national agencies into competition with private industry and the results that have attended these experiments. The beginnings of the electrical industry are cited to show how many municipal plants came to be started, and facts and figures are included to show the results. The charts in this first chapter graphically picture the municipal situation as it exists in the country today and the relative unimportance of the output of the city operated power companies.

The second chapter lists a number of questions and answers on this general question, the questions being those that most generally arise in discussions of municipal operation.

The next chapter is important since it is devoted to the opinions of leaders of thought, prominent industrialists, newspapers, commissions, etc. These are listed under separate headings for easy reference.

Chapters IV and V give facts and authentic statements on the large number of municipalities that have abandoned political operation of their electric utilities and are now taking service from privately owned and operated companies. It is specified in each case whether the town, city or village still owns its distribution system and purchases energy wholesale or whether the distribution system as well as the generating facilities have been sold or abandoned in favor of efficient, twenty-four hour service from private companies. This information is listed alphabetically under state headings.

As an official publication of the National Electric Light Association dealing with problems that not only are of concern to everyone connected with or interested in the industry, but are also vital issues of government and politics, this book is a distinct and valuable contribution. Factual in every sense of the word and general in its treatment of the subject as well as specific in its dealing with definite cases, it is invaluable for reference and a veritable mine of information.—R. S.

Developing Electric Service for the Farm. Serial Report of the Rural Electric Service Committee. N.E.L.A. publication No. 289-12; 15 pp. Price 25 cents; to members, 15 cents.

TO make available practical information as to how electric light and power companies may organize to develop electric service on the farm, the Rural Electric Service Committee has undertaken issuance of a series of reports which reflect in detail how this class of business is being handled by a number of companies.

This report is the first of the series. It sets forth the experiences of the Wisconsin Power & Light Company located at Madison, Wis., and describes in detail the agricultural characteristics of the territory served, the company organization, the activities of the rural service department, the procedure in establishing service, the rates and contract forms for rural service, rural line building, service to farm customers, meter reading, developing appreciation of electric service (in the company and on the farm), selling equipment, the ideal arrangement for dealing with rural customers, cooperation with other agencies and the results obtained.

Illustrative charts and maps make the report interesting, and it will undoubtedly suggest new ideas even to the company which has had considerable rural electrification experience.—V. W. P.

Recommended Practices for Design and Construction of Rural Lines: N.E.L.A. Pub. No. 289-16, 28 pages. Price 40 cents; to members, 25 cents.

THIS report of the Overhead Systems Committee, Engineering National Section, discusses the various phases of rural electric line construction, some of which are: Location of lines and poles, voltage, span lengths, types and sizes of poles (with clearance charts and tables of ultimate fiber stresses and resisting moments), grading of lines, pole framing, excavation for poles (with

(*Continued on page* 128)

Member Companies of the National Electric Light Association

THE lists appended hereto present the names of the member companies of the National Electric Light Association as of Jan. 1, 1929, with the exception of Classes F and H, which will appear in the next issue. They are classified as follows:

Class A (Light and power companies)	755
Class D (Manufacturers)	416
Class F (Associate companies)	402
Class H (Foreign)	128
	1,701

In addition to its member companies, the Association has 18,944 individual members, classified thus:

Class B (Employees of light and power companies)	15,192
Class C (Invited members)	113
Class E (Employees of manufacturer comoanies)	2,867
Class G (Employees of associate companies)	710
Class I (Foreign individual members)	62
	18,944

Total all classes of members, 20,645.

The names of the light and power companies invariably are listed at the principal place of production or distribution of energy. Where the general office of any company is located at some other point, the address of the general office is shown immediately following the name of the company.

Light and power companies (Class A) are listed first, followed in sequence by companies or firms engaged in the manufacture of electrical apparatus or equipment for the production or use of electrical energy (Class D); companies or firms of electrical jobbers, contractors, dealers, electrical or mechanical engineers, publishers, associations or others, corporations or individuals who are interested in advancing the use of electrical energy (Class F); and individuals or corporations not residents of North America engaged in the central station industry, or interested in advancing the use of electrical energy (Class H).

Light and Power Companies

(Class A)

"Class A members shall be regularly incorporated public service companies engaged in producing and supplying electrical energy for light, heat or power for public use." — *Constitution, Art. III, Sec. 2.*

Alabama

Birmingham—Alabama Power Company; Birmingham Electric Company.
River Falls—River Falls Power Company.

Arizona

Flagstaff—Flagstaff Electric Light Company.
Kingman—Public Utilities Consolidated Corporation.
Nogales—Southern Arizona Power Company.
Phoenix—Arizona Edison Company; Central Arizona Light & Power Company.
Prescott—The Arizona Power Company.
Tucson—The Tucson Gas, Electric Light & Power Company.
Winslow—Arizona Electric Power Company.

Arkansas

Blytheville—Arkansas-Missouri Power Company.
Fort Smith—Fort Smith Light & Traction Co.
Helena—Arkansas Utilities Company.
Hot Springs National Park—Citizens Electric Company.
Pine Bluff—Arkansas Power & Light Company.
Warren—Arkansas General Utilities Company.
(Harrisburg, Pa.)

California

Bay Point—Bay Point Light & Power Company.
Boulder Creek—Public Utilities California Corporation.
Fresno—San Joaquin Light & Power Corporation.
Los Angeles—Los Angeles Gas & Electric Corporation.
(Box 1100, Station C)
Southern California Edison Company.
Ontario—Ontario Power Company.
Riverside—The Southern Sierras Power Company.
St. Helena—Napa Valley Electric Company.
San Diego—San Diego Consolidated Gas & Electric Company.
(P. O. Box 1374)
San Francisco—Feather River Power Company
(530 Bush Street)
Great Western Power Company of California
(225 Bush Street)
Pacific Gas & Electric Company
(245 Market Street)
Peoples California Hydro-Electric Corporation
(Portland, Ore.)
Coast Counties Gas & Electric Company
(2500 Russ Bldg.)
Vallejo—Vallejo Electric Light & Power Company.

(Class A Members Continued)

Willits—Central Mendocino County Power Company.

Colorado

Denver—Public Service Company of Colorado.
Summit County Power Company
(1066 Gas & Electric Bldg.)
Durango—Western Colorado Power Company.
Evergreen—Evergreen Public Service Company.
Glenwood Springs—The Glenwood Light & Water Company.
Golden—Colorado Central Power Company.
Greeley—The Home Gas & Electric Company.
Pueblo—Southern Colorado Power Company.
Silverton—The Silverton Electric Light Company.
Trinidad—The Trinidad Electric Trans. Ry. & Gas Company.

Connecticut

Danbury—Danbury & Bethel Gas & Electric Light Company.
Derby—The Derby Gas & Electric Company.
East Hampton—Central Connecticut Power & Light Company.
Hartford—The Hartford Electric Light Company.
Litchfield—The Litchfield Electric Light & Power Company.
Mystic—Mystic Power Company.
New London—Connecticut Power Company.
Norwich—The Eastern Connecticut Power Company.
South Manchester—Manchester Electric Company.
Stamford—The Stamford Gas & Electric Company.
Thompsonville—The Northern Connecticut Power Company.
Waterbury—The Connecticut Light & Power Company.
Willimantic—Rockville-Willimantic Ltg. Company.

Delaware

Wilmington—American Power Company; Delaware Electric Power Company.

Dist. Columbia

Washington—Potomac Electric Power Company.

Florida

Auburndale—Auburndale Power Company.
Fernandina—Southern States Power Company.
Hastings—Hastings Power & Ice Company.
Key West—The Key West Electric Company.
Madison—Madison County Power Company.
Miami—Florida Power & Light Company.
Monticello—The Jefferson County Power Company.
Pensacola—Gulf Power Company.
Perry—Taylor County Power Company.
St. Petersburg—Florida Power Corporation.
Tampa—Tampa Electric Company.

Georgia

Albany—South Georgia Power Company.
Atlanta—Georgia Power Company.
(Electric & Gas Building)
Augusta—Augusta Aiken Railway & Electric Corporation.
Blue Ridge—Toccoa Electric Power Company.
(Tennessee Electric Power Building, Chattanooga, Tenn.)

(Class A Members Continued)

Brunswick—Mutual Light & Water Company.
Camilla—Baker County Power Company.
Columbus—Columbus Electric & Power Company.
Griffin—Georgia Hydro-Electric Company.
Macon—Macon Railway & Light Company.
Savannah—Savannah Electric & Power Company.
Valdosta—Georgia Power and Light Company.

Idaho

Boise—Idaho Power Company.
Coeur D'Alene—Kootenai Power Company, Ltd.
Salmon—Salmon River Power & Light Company.
Wallace—Public Utilities Consolidation Corporation.
(Wallace Division)

Illinois

Alton—Alton Light & Power Company.
Aurora—Western United Gas & Electric Company.
Chicago—Byllesby Engineering & Management Corporation.
(231 So. LaSalle Street)
Central Public Service Corporation
(105 West Adams Street)
Commonwealth Edison Company
(72 West Adams Street)
Illinois Power & Light Corporation
(231 So. LaSalle Street)
Inland Power & Light Corporation
(79 West Monroe Street)
Middle West Utilities Company
(72 West Adams Street)
Midland Utilities Company
(2025 122 South Michigan Avenue)
National Public Utilities Company
(39 South LaSalle Street, Room 1420)
North American Light & Power Company
(231 So. LaSalle Street)
Public Service Company of Northern Illinois
(72 West Adams Street)
The United Light & Power Company
(2200 Bankers Building)
United Public Service Company
(100 West Monroe Street)
Utilities Management Company
(29 South LaSalle Street)
Chicago—Utilities Power & Light Corporation.
(327 South LaSalle Street)
Dixon—Illinois Northern Utilities Company.
East St. Louis—East St. Louis Light & Power Company.
Galena—Interstate Light & Power Company.
Lincoln—Illinois Public Utility Company.
Moline—People's Power Company.
Mt. Carmel—Mt. Carmel Public Utility & Service Company.
Peoria—Central Illinois Light Company.
Rockford—Rockford Electric Company.
Springfield—Central Illinois Public Service Company; Illinois Power Company.

Indiana

Anderson—Traction Light & Power Company.
Attica—Attica Electric Company.
Clinton—Wabash Valley Electric Company.
Evansville—Southern Indiana Gas & Electric Company.
Ft. Wayne—Indiana Service Corporation.
Greensburg—Hoosier Public Utility Company.
Hammond—Northern Indiana Public Service Company.

(Class A Members Continued)

Indianapolis—Central Indiana Power Company.
(606 Guaranty Building)
Indianapolis Power & Light Company.
(48 Monument Circle)
Interstate Public Service Company
(Wild Building, 129 East Market)
Kokomo—Northern Indiana Power Company.
La Porte—La Porte Gas & Electric Company.
Madison—Madison Light & Power Company.
Marengo—General Utilities Company.
Marion—Indiana General Service Company.
Richmond—The Liberty Light & Power Company.
South Bend—Indiana & Michigan Electric Company.
Terre Haute—Terre Haute Indianapolis & Eastern Traction Company.
(Terre Haute Division)
Union City—Union City Electric Company.
Winchester—Citizens Heat Light & Power Company.

Iowa

Cedar Rapids—Iowa Electric Company; Iowa Railway & Light Corporation.
Centerville—Iowa Southern Utilities.
Clear Lake—Clear Lake Electric Light & Power Company.
Council Bluffs—Citizens Gas & Electric Company.
Davenport—People's Light Company.
Des Moines—Iowa Power and Light Company.
Dubuque—Central States Power and Light Corporation.
Dubuque—Eastern Iowa Electric Company; Interstate Power Company.
Fort Dodge—Fort Dodge Gas & Electric Company.
Fort Madison—Fort Madison Electric Company.
Glenwood—Mills County Power Company.
(Ralston, Neb.)
Iowa City—Iowa City Light & Power Company.
Iowa Falls—Central States Electric Company.
Keokuk—Keokuk Electric Company; Mississippi River Power Company.
Mason City—Peoples Gas & Electric Company.
Northwood—Northwood-Kensett Electric Company.
Sioux City—Iowa Public Service Company; McGraw Electric Company.
(120 South LaSalle Street, Chicago, Ill.)
Sioux City Gas & Electric Company

Kansas

Abilene—The United Power & Light Corporation of Kansas.
Caney—The Caney Electric Company.
Concordia—The Kansas Power Company.
Cottonwood Falls—Inter-County Electric Company.
Fort Scott—Kansas Utilities Company.
Goodland—Public Utilities Consolidated Corporation.
(Goodland Division)
Lawrence—Kansas Electric Power Company.
Salina—The Western Light & Power Corporation.
Topeka—The Kansas Power & Light Company.
Wichita—Kansas Gas & Electric Company.

Kentucky

Augusta—Kentucky Power Company.
Bloomfield—Kentucky Service Company.
Bowling Green—Kentucky-Tennessee Light & Power Company.
Covington—Union Light Heat & Power Company.
Hazard—Kentucky & West Virginia Power Company.
Lexington—Lexington Utilities Company.
Louisville—Kentucky Utilities Company.
(Starks Building)
Louisville Gas & Electric Company.
Maysville—Kentucky Power & Light Company.

Louisiana

Alexandria—Louisiana Ice & Utilities, Inc.
Algiers—Louisiana Power & Light Company.
Baton Rouge—Baton Rouge Electric Company.
Lafayette—Louisiana Public Utilities Company, Inc.
New Iberia—Gulf Public Service Company.
New Orleans—New Orleans Public Service, Inc.
Shreveport—Southwestern Gas & Electric Company.

Maine

Augusta—Central Maine Power Company; New England Public Service Company.
Bangor—Bangor Hydro-Electric Company.
Biddeford—Clark Power Company.
Calais—St. Croix Gas Light Company.
Caribou—Caribou Water, Light & Power Company.
Fort Kent—Fort Kent Electric Company.
Island Falls—Katahdin Electric Company.
Kezar Falls—Cornish & Kezar Falls Light & Power Company.
Milo—Milo Electric Light & Power Company.
Portland—Cumberland County Power & Light Company.
Presque Isle—Gould Electric Company.
Rumford—Rumford Falls Light & Water Company.
South Berwick—Berwick & Salmon Falls Electric Company.
(181 State Street, Boston, Mass.)

(Class A Members Continued)

Maryland

Annapolis—Annapolis & Chesapeake Bay Power Company.
Baltimore—Consolidated Gas Electric Light & Power Company.
(Lexington Bldg., Lexington and Liberty Streets)
General Utilities & Operating Company
(1310 Standard Oil Building)
Hagerstown—The Potomac Edison Company.
Salisbury—Eastern Shore Public Service Company.

Massachusetts

Adams—Adams Gas Light Company.
(77 Franklin Street, Boston, Mass.)
Agawam—Agawam Electric Company.
(73 State Street, Springfield, Mass.)
Amesbury—Amesbury Electric Light Company.
Amherst—Amherst Gas Company.
Athol—Athol Gas & Electric Company.
Attleboro—Attleboro Steam & Electric Company.
Ayer—Ayer Electric Light Company.
Beverly—Beverly Gas & Electric Company.
Boston—Atlantic Public Utilities, Inc.
(250 Stuart Street)
Eastern Massachusetts Electric Company
(200 Devonshire Street)
Edison Electric Illuminating Company of Boston
(70 State Street)
Stone & Webster, Inc.
(49 Federal Street)
Charles H. Tenney & Company
(200 Devonshire Street)
Brockton—Edison Electric Illuminating Company of Brockton.
Cambridge—Cambridge Electric Light Company.
Charlestown—Charlestown Gas & Electric Company.
Clinton—Clinton Gas Light Company.
Easthampton—Easthampton Gas Company
East Pepperell—Middlesex County Electric Company.
East Weymouth—Weymouth Light & Power Company.
Fall River—Fall River Electric Light Company.
Fall River—Montaup Electric Company.
Fitchburg—Fitchburg Gas & Electric Light Company.
Franklin—Union Light & Power Company.
Gardner—Gardner Electric Light Company.
Gloucester—Gloucester Electric Company.
Greenfield—Greenfield Electric Light & Power Company.
Haverhill—Haverhill Electric Company.
Holyoke—Holyoke Water Power Company.
Hyannis—Cape & Vineyard Electric Company.
Lawrence—Lawrence Gas & Electric Company.
Lee—Lee Electric Company.
Leominster—Leominster Electric Light & Power Company.
Lowell—The Lowell Electric Light Corporation.
Ludlow—Ludlow Electric Light Company
(73 State Street, Springfield, Mass.)
Lynn—Lynn Gas & Electric Company.
Malden—Malden Electric Company.
Manchester—Manchester Electric Company.
Marlborough—Marlborough Electric Company.
Milford—Milford Electric Light & Power Company.
New Bedford—New Bedford Gas & Edison Light Company.
North Abington—Electric Light & Power Company of Abington & Rockland.
North Adams—North Adams Gas Light Company.
Northampton—Northampton Electric Lighting Company.
Norton—Norton Power & Electric Company.
Palmer—Central Massachusetts Electric Company.
Pittsfield—Pittsfield Electric Company.
Plymouth—Plymouth Electric Light Company.
Provincetown—Provincetown Light & Power Company.
Quincy—Quincy Electric Light & Power Company.
Randolph—Randolph & Holbrook Power & Electric Company.
(150 Congress Street, Boston, Mass.)
Revere—Suburban Gas & Electric Company.
Salem—Salem Electric Lighting Company.
Spencer—Spencer Gas Company
(77 Franklin Street, Boston, Mass.)
Springfield—United Electric Light Company.
Stockbridge—Southern Berkshire Power & Electric Company.
Turners Falls—Turners Falls Power & Electric Company.
Uxbridge—Worcester Suburban Electric Company.
Ware—Ware Electric Company.
Wareham—Southeastern Massachusetts Power & Electric Company.
Webster—Webster & Southbridge Gas & Electric Company.
Westboro—Westboro Gas & Electric Company.
Williamsburg—Mill River Electric Light Company.
(77 Franklin Street, Boston, Mass.)
Williamstown—Williamstown Gas Company.
(77 Franklin Street, Boston, Mass.)
Winchendon—Winchendon Electric Light & Power Company.
Worcester—New England Power Company.
(85 Harvard Street)
Worcester Electric Light Company
(11 Foster Street)

(Class A Members Continued)

Michigan

Adrian—Citizens Light & Power Company.
Alpena—Alpena Power Company.
Benton Harbor—Benton Harbor & St. Joe Railway & Light Company.
Detroit—The Detroit Edison Company.
Frankfort—Lower Peninsula Power Company.
Grand Beach—Berrien Gas & Electric Company.
(Hammond, Ind.)
Houghton—Houghton County Electric Light Company.
Hudson—Southern Michigan Light & Power Company.
Iron River—Iron Range Light & Power Company.
Jackson—Commonwealth Power Corporation; Consumers Power Company.
Lapeer—Michigan Electric Power Company.
Menominee—Menominee & Marinette Light & Traction Company.
Rogers City—Rogers City Electric Light & Power Company.
Sault Ste. Marie—The Chippewa Edison Company; Edison Sault Electric Company.
Tecumseh—The Tecumseh Electric Company.
Three Rivers—Michigan Gas & Electric Company.
Traverse City—Michigan Public Service Company.

Minnesota

Arlington—Peoples Minnesota Gas & Electric Corporation.
Canby—Union Public Service Company.
(Pioneer Building, St. Paul, Minn.)
Dodge Center—Iowa Minnesota Light & Power Company.
Duluth—Minnesota Power & Light Company.
Dumont—Dumont Electric Company.
Fergus Falls—Otter Tail Power Company.
Jasper—Home Light and Power Company.
Jordan—Jordan Electric Light & Heating Company.
Kenyon—Gunderson Electric Company.
Minneapolis—The Minneapolis General Electric Company.
Montana Dakota Power Company
(831 Second Avenue, South)
Northern States Power Company
(15 South Fifth Street)
Northwestern Public Utilities, Inc.
(554 McKnight Building)
Public Utilities Consolidated Corporation
(Foshay Building)
Pine City—Eastern Minnesota Power Company.
Preston—Root River Power & Light Company.
Proctor—Proctor Water and Light Company.
Redwood Falls—Redwood Falls Light & Power Company.
Twin Valley—Croswell Power Company.
Waconia—Western Power & Light Company.
Wheaton—Wheaton Electric Light Company.
Winona—Mississippi Valley Public Service Company.

Mississippi

Gulfport—Mississippi Power Company.
Jackson—Mississippi Power & Light Company.

Missouri

Joplin—Empire District Electric Company.
Kansas City—Kansas City Power & Light Company.
(1330 Grand Avenue)
Lexington—Missouri Gas & Electric Service Company.
Louisiana—Missouri Edison Company.
Maryville—Maryville Electric Light & Power Company.
(Gas & Electric Building, Lincoln, Neb.)
Mexico—Missouri Power & Light Company.
(740 Board of Trade Building, Kansas City, Mo.)
Pleasant Hill—Missouri Public Service Company.
(Warrensburg, Mo.)
Ste. Genevieve—Missouri General Utilities Company.
St. Joseph—St. Joseph Railway Light Heat & Power Company.
St. Louis—Community Power & Light Company.
(Fourth and Pine Streets)
General Public Utilities Company
(205 Planters Building)
The Laclede Power & Light Company
(1017 Olive Street)
Union Electric Light and Power Company
Sedalia—The City Light & Traction Company.
Sikeston—Missouri Utilities Company.
Springfield—Springfield Gas & Electric Company.
Troy—East Missouri Power Company.

Montana

Butte—The Montana Power Company.
Dillon—Union Electric Company.
Helena—Helena Gas & Electric Company.
Missoula—Missoula Public Service Company.
Plains—Plains Light & Water Company.
Polson—Public Utilities Consolidated Corporation.
(Polson Division)

(Class A Members Continued)

Nebraska

Gothenburg—Gothenburg Light & Power Company.
Grand Island—Central Power Company.
Lincoln—Iowa-Nebraska Light & Power Company.
(Gas & Electric Building)
Loup City—Nebraska Electric Power Company.
McCook—Nebraska Light & Power Company.
Omaha—Central West Public Service Company.
(117-123 North 13th Street)
Central West Public Service Company of Nebraska
(117-123 North 13th Street)
O'Neill—Interstate Power Company of Nebraska.
(1000 Main Street, Dubuque, Iowa)
Palisade—F. C. Krotter.
Scottsbluff—Western Public Service Company.
Superior—Southern Nebraska Power Company.

Nevada

East Ely—Ely Light & Power Company.
Elko—Elko Lamoille Power Company.
Goldfield—Nevada-California Power Company.
Lovelock—Nevada Valleys Power Company.
Reno—Sierra Pacific Power Company.
Winnemucca—Western States Utilities Company.

New Hampshire

Bethlehem—Bethlehem Electric Company.
Concord—Concord Electric Company.
Derry—Derry Electric Company.
(P. O. Box 210, Portsmouth, N. H.)
Exeter—Exeter & Hampton Electric Company.
Lebanon—Grafton County Electric Light & Power Company.
Manchester—Public Service Company of New Hampshire.
Newport—New Hampshire Power Company.
North Conway—Goodrich Falls Electric Company.
Portsmouth—New Hampshire Gas & Electric Company.

New Jersey

Asbury Park—Eastern New Jersey Power Company; Jersey Central Power & Light Company.
Atlantic City—Atlantic City Electric Company.
Closter—Rockland Electric Company.
(Care of Rockland Light & Power Company, Nyack, N. Y.)
Dover—New Jersey Power & Light Company.
(Second and Ferry Streets, Easton, Pa.)
Millville—Millville Electric Light Company.
Newark—Public Service Electric & Gas Company.

New Mexico

Albuquerque—Albuquerque Gas & Electric Company.
Clovis—New Mexico Utilities Company.
Deming—Deming Ice & Electric Company.
Gallup—Gallup Electric Light & Power Company.
Las Cruces—Mesilla Valley Electric Company.
Las Vegas—The Las Vegas Light and Power Company.
Sante Fe—New Mexico Power Company.

New York

Albany—Mohawk-Hudson Power Corporation.
(126 State Street)
New York Power and Light Corporation
(126 State Street)
Binghamton—Binghamton Light, Heat and Power Company.
Buffalo—Buffalo General Electric Company.
(Electric Building)
Buffalo, Niagara & Eastern Power Corporation
(Electric Building)
Niagara Lockport & Ontario Power Company
(400 Electric Building)
Canajoharie—Montgomery Electric Light & Power Company.
(94 Church Street)
Cazenovia—Cazenovia Electric Company.
Cold Spring—Cold Spring Light, Heat & Power Company.
Corinth—Corinth Electric Light & Power Company.
Cortland—Cortland County Traction Company.
Ellenville—Ellenville Electric Company.
Elmira—Elmira Water Light & Railroad Company.
Fillmore—Genesee Valley Power Company, Inc.
Fulton—Fulton Light Heat & Power Company.
Geneseo—The Geneseo Gas Light Company.
Gouverneur—Oswegatchie Light & Power Company.
Granville—Granville Electric Company.
Lancaster—Western New York Gas and Electric Corporation.
Lockport—Lockport Light Heat & Power Company.
Malone—Malone Light & Power Company.
Monroe—Orange & Rockland Electric Company.
Mount Morris—Mt. Morris Illuminating Company.
Mount Vernon—Westchester Lighting Company.
Newfane—Lockport & Newfane Power & Water Supply Company.

(Class A Members Continued)

New York City:
Bronx Westchester—The Bronx Gas & Electric Company.
(P. O. Box 50)
Brooklyn—Brooklyn Edison Company, Inc.
Manhattan—Allied Power & Light Corporation.
(20 Pine Street)
American Electric Power Company
(20 Pine Street)
American Gas & Electric Company
(30 Church Street)
American Water Works & Electric Company, Inc.
(50 Broad Street)
Associated Gas & Electric Company
(33 Liberty Street)
W. S. Barstow & Company
(50 Pine Street)
Cities Service Company
(60 Wall Street)
Cities Service Power & Light Company
(60 Wall Street)
Henry L. Doherty & Company
(60 Wall Street)
Electric Bond & Share Company
(2 Rector Street)
Electric Management & Engineering Corporation
(57 William Street—14th Floor)
Electrical Securities Corporation
(31 Nassau Street)
Engineers Public Service Company
(120 Broadway)
Federal Light & Traction Company
(52 William Street—21st Floor)
Long Island Lighting Company
(50 Church Street)
National Electric Power Company
(57 William Street)
National Public Service Company
(57 William Street)
The New York Edison Company
(130 East 15th Street)
Peoples Light & Power Corporation
(27 William Street—Suite 914-922)
The United Electric Light & Power Company
(130 East 15th Street)
The J. G. White Management Corporation
(33 Liberty Street)
Queens—Queens Borough Gas & Electric Company.
(Far Rockaway)
Queens—New York & Queens Electric Light & Power Company.
(Long Island City)
Richmond—Staten Island Edison Corporation.
(Lock Box "C," St. George, Staten Island)
Niagara Falls—Niagara Electric Service Corporation.
(109 Main Street)
The Niagara Falls Power Company
North Tonawanda—Tonawanda Power Company.
Nunda—Nunda Electric Light Company, Inc.
Nyack—Rockland Light & Power Company.
Oneonta—New York State Electric Corporation.
Ossining—Northern Westchester Lighting Company.
Oswego—Peoples Gas & Electric Company of Oswego.
Patchogue—Patchogue Electric Light Company
Peekskill—Peekskill Lighting & Railroad Company
(Ossining, New York)
Plattsburgh—Eastern New York Electric & Gas Company, Inc.
Potsdam—St. Lawrence County Utilities, Inc.
Poughkeepsie—Central Hudson Gas & Electric Corporation.
Rochester—Rochester Gas & Electric Corporation.
Sherrill—Kenwood Electric Light Company.
Syracuse—The Syracuse Lighting Company, Inc.
Utica—Utica Gas & Electric Company.
Walden—Wallkill Valley Electric Light & Power Company.
Wappingers Falls—Wappingers Electric Corporation.
Watertown—Northern New York Utilities, Inc.
Yonkers—Yonkers Electric Light & Power Company.

North Carolina

Chapel Hill—University Consolidated Service Plant
(Electric & Water Division)
Durham—Durham Public Service Company.
Greensboro—North Carolina Public Service Company.
Raleigh—Carolina Power & Light Company.
Wilmington—Tide Water Power Company.

North Dakota

Amenia—Amenia Power Company.
Arthur—Hunter Power Company.
Bismarck—Hughes Electric Company.
Devils Lake—Dakota Public Service Company.
Fargo—Union Light, Heat & Power Company.
Grand Forks—Red River Power Company.
Harvey—Central Light & Power Company.
Pembina—Interstate Power Company of North Dakota
(1000 Main Street, Dubuque, Iowa)

(Class A Members Continued)

Ohio

Akron—Northern Ohio Power & Light Company.
Alliance—The Suburban Power Company.
Ansonia—The Ansonia Lighting Company.
Archbold—The Archbold Electric Service Company.
Athens—The Southern Ohio Electric Company.
Bowling Green—The Ohio Northern Public Service Company.
Canton—The Ohio Power Company.
Cincinnati—Columbia Engineering & Management Corporation
(314 West Fourth Street)
The Union Gas & Electric Company.
Cleveland—The Buckeye Public Service Company
(1803 Terminal Tower Building)
Cleveland Electric Illuminating Company
(Box 392)
The Cleveland Light & Power Company
(8 St. Clair Avenue, N. W.)
The Lake Erie Power & Light Company
(Union Trust Building)
The Ohio Public Service Company
(1800 Keith Building)
The Western Reserve Power & Light Company
(1670 Union Trust Building)
Columbus—Columbus Railway Power & Light Company
(104 North Third Street)
The Ohio Utilities Company
(150 East Broad Street)
The Scioto Valley Railway & Power Company
(Third and Rich Streets)
Covington—The Buckeye Light & Power Company.
Dayton—The Dayton Power & Light Company.
Eaton—The Eaton Lighting Company.
Findlay—The Toledo Bowling Green & South Traction Company.
Greenville—The Brookville & Lewisburg Lighting Company.
Greenville Electric Light & Power Company.
London—London Light & Power Company.
Marion—Columbus Delaware & Marion Electric Company.
North Baltimore—The North Baltimore Service Company
(Room 1146, 29 South LaSalle Street, Chicago, Ill)
Rockford—Rockford Light & Power Company.
Rudolph—Rudolph Light & Power Company
(29 South LaSalle Street, Chicago, Ill.)
Sidney—Ohio Electric Power Company.
Springfield—Ohio Edison Company.
Toledo—The Lake Shore Power Company
(714 Washington Street)
The Toledo Edison Company
Wooster—The Wooster Electric Company.
Youngstown—The Pennsylvania-Ohio Power & Light Company.
Zanesville—Southern Ohio Public Service Company.

Oklahoma

Fairfax—Oklahoma Utilities Company.
Oklahoma City—Southwestern Light & Power Company; Oklahoma Gas & Electric Company.
Sand Springs—Oklahoma Power & Water Company.
Tulsa—Public Service Company of Oklahoma.

Oregon

Albany—Mountain States Power Company.
Athena—Preston-Shaffer Milling Company.
Aurora—Molalla Electric Company.
Baker—Eastern Oregon Light & Power Company.
Bend—Deschutes Power & Light Company.
Hermiston—Hermiston Light & Power Company.
Medford—The California Oregon Power Company.
Newberg—Yamhill Electric Company.
Portland—Northwestern Electric Company
(Public Service Building)
Pacific Power & Light Company
(Gasco Building)
Peoples West Coast Hydro-Electric Corporation
(212 Fitzpatrick Building)
Portland Electric Power Company.

Pennsylvania

Allentown—Pennsylvania Power & Light Company.
Altoona—Penn Central Light & Power Company.
Bedford—Bedford Electric Light, Heat & Power Company.
Bradford—Bradford Electric Company
(68 Chestnut Street)
Carlisle—The Carlisle Gas & Water Company.
Chester—Delaware County Electric Company.
Coatesville—Chester Valley Electric Company.
Colver—Colver Electric Company
(123 South Broad Street, Philadelphia)
Cresson—Cresson Electric Light Company.
Delta—Delta Electric Power Company.
Dushore—Sullivan County Electric Company.
Eagles Mere—Eagles Mere Light Company.
Erie—Erie County Electric Company; Erie Lighting Company.
Everett—Everett Light, Heat & Power Company.
Forty Fort-Kingston—Harvey's Lake Light Company.
Glen Rock—Glen Rock Electric Light & Power Company.

(Class A Members Continued)

Greencastle—Greencastle Light, Heat, Fuel & Power Company
(Coatesville, Pa.)
Greenville—Pennsylvania Power Company.
Holtwood—Pennsylvania Water & Power Company
(Lexington Building, Baltimore, Md.)
Johnstown—Pennsylvania Electric Company.
Kennett Square—Chester County Light & Power Company.
Kingston—Luzerne County Gas & Electric Corporation.
Lancaster—Edison Electric Company.
La Plume—Abington Electric Company.
Mauch Chunk—Mauch Chunk Heat Power & Electric Light Company.
Meadville—Harley D. Carpenter.
Mercersburg—Mercersburg, Lehmasters & Markes Electric Company.
Milford—Pike County Light & Power Company
(Nyack, N. Y.)
Natrona—Natrona Light & Power Company.
Norristown—Philadelphia Suburban-Counties Gas & Electric Company.
Oil City—Citizen's Light & Power Company.
Oxford—Southern Pennsylvania Power Company.
Palmerton—Palmerton Lighting Company.
Philadelphia—E. W. Clark Engineering Corporation
(321 Chestnut Street)
Day & Zimmermann, Inc.
(112 North Broad Street)
The Philadelphia Electric Company.
(1000 Chestnut Street)
United Gas Improvement Company
(Broad and Arch Streets)
Pittsburgh—The Duquesne Light Company.
The West Penn Electric Company
(14 Wood Street)
The West Penn Power Company
(West Penn Building)
Reading—Metropolitan Edison Company.
Renovo—Renovo Edison Light, Heat & Power Company.
Scranton—The Scranton Electric Company.
Titusville—Titusville Light & Power Company.
Tyrone—Home Electric Light & Steam Heating Company.
Waynesboro—South Penn Power Company.
Wellsboro—Wellsboro Electric Company.
Windber—Windber Electric Corporation.
York—Edison Light & Power Company.

Rhode Island

Newport—Newport Electric Corporation.
Pawtucket—Blackstone Valley Gas & Electric Company.
Providence—The Narragansett Electric Company.
Westerly—South County Public Service Company.

South Carolina

Belton—Belton Light & Power Company.
Charleston—South Carolina Power Company.
Conway—Quattlebaum Light & Ice Company.
Denmark—The Edisto Public Service Company.

South Dakota

Deadwood—Consolidated Power & Light Company.
Huron—Northwestern Public Service Company.
Mobridge—Northern Power & Light Company.
Rapid City—The Dakota Power Company.
Salem—Salem Milling, Lighting & Heating Company.
Watertown—Watertown Public Service Company.

Tennessee

Bristol—Bristol Gas & Electric Company.
Chattanooga—Southern Cities Power Company
(Provident Building)
The Tennessee Electric Power Company.
Jackson—West Tennessee Power & Light Company.
Johnson City—Tennessee Eastern Electric Company.
Kingsport—Kingsport Utilities Incorporated.
Knoxville—Knoxville Power & Light Company.
Memphis—Memphis Power & Light Company.
Nashville—Nashville Railway & Light Company.
Springfield—Tennessee Light & Power Company.
Watertown—South Kentucky Power Company.

Texas

Abilene—West Texas Utilities Company.
Amarillo—Southwestern Public Service Company.
Beaumont—Gulf States Utilities Company.
Borger—Panhandle Power & Light Company.
Dalhart—Dalhart Public Service Company.
Dallas—Central & South West Utilities Company
(1100 Allen Building)
Dallas Power & Light Company
(Interurban Building)
Texas Power & Light Company
(728 Interurban Building)
El Paso—El Paso Electric Company.
Fort Worth—Fort Worth Power & Light Company; Northern Texas Traction Company; Texas-Louisiana Power Company.
Freeport—Freeport Sulphur Company.
Galveston—Galveston Electric Company.
Girvin—Pecos Valley Power & Light Company
(Fort Worth National Bank Building, Fort Worth)
Goldthwaite—Goldthwaite Light & Ice Company.

(Class A Members Continued)

Houston—Houston Lighting & Power Company.
Hubbard—Union Central Light & Power Company.
Mexia—Community Power & Light Company of Texas.
Plainview—Texas Utilities Company.
San Antonio—Central Power & Light Company
(1020 Frost National Bank Building)
San Antonio Public Service Company.
Weatherford—City of Weatherford Water, Light & Ice Company.

Utah

Cedar City—Dixie Power Company.
Moroni—Big Springs Power Company.
Salt Lake City—Telluride Power Company; Utah Power & Light Company.

Vermont

Bellows Falls—Fall Mountain Electric Company.
Brattleboro—Twin State Gas & Electric Company
(131 State Street, Boston, Mass.)
Middlebury—Middlebury Electric Company.
Montpelier—Green Mountain Power Corporation.
Newport—Newport Electric Light Company; Public Utilities Vermont Corporation.
Rutland—Public Service Corporation of Vermont.
Rutland Railway, Light & Power Company
(131 State Street, Boston, Mass.)
Vermont Hydro Electric Corporation.
St. Albans—Public Electric Light Company
(161 Devonshire Street, Boston, Mass.)
Windsor—Windsor Electric Light Company.
Woodstock—Woodstock Electric Company.

Virginia

Charlottesville—Virginia Public Service Company.
Harrisonburg—Shenandoah River Power Company.
Purcellville—Loudoun Light & Power Company.
Richmond—Virginia Electric & Power Company.
Winchester—Northern Virginia Power Company.

Washington

Aberdeen—Grays Harbor Railway & Light Company.
Cheney—Cheney Light & Power Company.
Colville—Stevens County Power & Light Company.
Deer Park—Mount Spokane Power Comnany.
Port Angeles—Northwestern Power & Light Company.
Raymond—Willapa Electric Company.
Seattle—Puget Sound Power & Light Company.
Washington Irrigation & Development Company
(905 White Building)
Spokane—The Washington Water Power Company.
Tacoma—Washington Gas & Electric Company.

West Virginia

Charleston—Appalachian Electric Power Company.
Charleston—Columbia Gas & Electric Corporation
(61 Broadway, New York, N. Y.)
Fairmont—Monongahela West Penn Public Service Company.
Iaeger—United Light & Power Company.
Martinsburg—Potomac Light & Power Company.
Mullens—Union Power Company
(Kanawha National Bank Building, Charleston)
Petersburg—Community Power Company; Potomac Valley Power Corporation.
Piedmont—Piedmont Electric Light & Power Company.
War—War Light & Water Company.
Wheeling—Wheeling Electric Company.

Wisconsin

Abbotsford—Midland Public Service Company.
Amery—Wisconsin Hydro Electric Company.
Ashland—Lake Superior District Power Company.
Eau Claire—Northern States Power Company of Wisconsin.
Green Bay—Wisconsin Public Service Corporation.
Lake Geneva—Southern Wisconsin Electric Company.
Madison—Madison Gas & Electric Company.
Wisconsin Power & Light Company
(16 Carroll Street)
Milwaukee—Milwaukee Electric Railway & Light Company.
Prairie du Chien—Interstate Power Company of Wisconsin
(1000 Main Street, Dubuque, Iowa)
Racine—Wisconsin Gas & Electric Company.
Superior—Superior Water, Light & Power Company.
Waupaca—Waupaca Electric Service & Railway Company.
Wausau—Wisconsin Valley Electric Company.
West Bend—Wisconsin Public Utility Company.

Wyoming

Casper—Mountain States Power Company.
Cheyenne—The Cheyenne Light, Fuel & Power Company.
Lander—Lander Electric Light & Power Company.
Rawlins — The Rawlins Electric Light & Fuel Company.
Sheridan—The Sheridan County Electric Company.

(Class A Members Continued)

Territorial Possessions

Alaska

Cordova—Alaska Public Utilities.
Juneau—Alaska Electric Light & Power Company.
Ketchikan—Citizens Light, Power & Water Company.
Valdez—Prince William Sound Water, Power, Light & Telephone Company.

Hawaii

Hilo—Hilo Electric Light Company, Limited.
Honolulu—The Hawaiian Electric Company, Limited.

Philippine Islands

Manila—The Manila Electric Company.

Porto Rico

Ponce—Ponce Electric Company.
San Juan—Porto Rico Railway, Light & Power Company.

CANADA

Alberta

Calgary—Calgary Power Company, Limited
(164 St. James Street, Montreal, Quebec)
Vegreville Utilities, Limited
(215 Sixth Avenue West)
Vulcan—Vulcan Light & Power Company, Limited.

British Columbia

Fernie—East Kootenay Power Company, Limited.
Rossland—West Kootenay Power & Light Company, Limited.
Vancouver—British Columbia Electric Railway Company, Limited.

Manitoba

Great Falls—Manitoba Power Company, Limited.
Winnipeg—Winnipeg Electric Company.

New Brunswick

Aroostook—Maine & New Brunswick Electric Power Company, Limited
(Presque Isle, Maine)
Bathurst—Bathurst Electric & Water Power Company, Limited.
Fredericton—The Maritime Electric Company, Limited.
Moncton—Moncton Tramways, Electricity & Gas Company, Limited.
St. John—New Brunswick Power Company.
St. Stephen—The Maritime Electric Company, Limited.
Woodstock—Woodstock Electric Railway, Light & Power Company.

Nova Scotia

Amherst—Canada Electric Company, Limited.
Halifax—Nova Scotia Light & Power Company, Limited.
New Waterford—Dominion Utilities Company, Limited.
Sydney—Cape Breton Electric Company.
Windsor—Avon River Power Company, Limited.
Yarmouth—Western Nova Scotia Electric Company, Limited.

Ontario

Arnprior—The Galletta Electric Power & Milling Company.
Cornwall—Stormont Electric Light & Power Company.
Erin—Caledon Electric Company, Limited.
Fort William—Kaministiquia Power Company, Limited.
Gananoque—The Gananoque Electric Light & Water Supply Company, Limited.
Hamilton—Dominion Power & Transmission Company, Limited.
Iroquois Falls—Abitibi Electric Development Company, Limited.
Massey—Lloyd Deagle & Company.
Mattawa—The Mattawa Electric Light & Power Company, Limited.
Merrickville—Rideau Power Company.
New Liskeard—Canada Northern Power Corporation, Limited; Northern Ontario Light & Power Company, Limited; Porcupine Power & Telephone Company, Limited.
Niagara Falls—Canadian Niagara Power Company, Limited.
Ottawa—Gatineau Electric Light Company, Limited; Gatineau Power Company; The Ottawa Electric Company; Ottawa & Hull Power Company, Limited.
Pembroke—The Pembroke Electric Light Company, Limited.
Renfrew—Calabogie Light & Power Company.
Sault Ste Marie—Algoma Steel Corporation, Limited; Great Lakes Power Company.
Timmins—Northern Canada Power, Limited.

Prince Edward Island

Charlottetown—Maritime Electric Company, Limited.

(Class A Members Continued)

Quebec

Angliers—Northern Quebec Power Company, Limited
(Quinze Power House)
Arvida—Duke-Price Power Company, Limited; Saguenay Electric Company.
Buckingham—Albert MacLaren Electric Light Plant.
Chambly—Chambly Power Corporation.
Grand Mere—Laurentide Power Company.
Huntingdon—Beauharnois Electric Company, Limited.
Montreal—Continental Heat & Light Company
(611 Power Building)
Great Northern Power Company
(614 Dominion Express Building)
Montreal Light, Heat & Power Consolidated.
South Shore Light, Heat & Power Corporation
(132 St. James Street)
Southern Canada Power Company
(330 Coristine Building)
Quebec—Quebec Power Company; Quebec Railway Light, Heat & Power Company.
Rimouski—Lower St. Lawrence Power Company.
St. Joseph—St. Francis Light & Power Company.
St. Timothee—The Canadian Light & Power Company.
Shawinigan Falls—Electric Service Corporation.
The Shawinigan Water & Power Company
(Montreal)
Sorel—Sorel Light & Power Company.
Thetford Mines—St. Francis Water Power Company.
Three Rivers—North Shore Power Company.

Saskatchewan

Regina—Arcola Light & Power Company.

Cuba

Havana—Havana Electric Railway, Light & Power Company
(Apartado 570)

Mexico

Guanajuato—Central Mexico Light & Power Company
(2 Rector Street, New York, N. Y.)
Mexico City—The Mexican Light & Power Company, Limited
(Apartado 490)
Monterey — Monterey Railway Light & Power Company
(Apartado 58)

Newfoundland

St. Johns—Newfoundland Light & Power Company, Limited; United Towns Electric Company, Limited.

Manufacturer Companies

Class D

"Class D members shall be companies or firms engaged in the manufacture of apparatus, machinery, equipment, supplies or material for the production or use of electrical energy."—*Constitution, Art. III, Sec.* 5.

Alabama

Birmingham—Bessemer Galvanizing Works
(205 Phoenix Building)

California

Alhambra—C. F. Braun & Company.
Los Angeles—Diamond Electrical Manufacturing Company
(1320 East Sixteenth Street)
Kelman Electric & Manufacturing Company
(1650 Naud Street)
San Francisco—Majestic Electric Appliance Company, Incorporated
(590 Folsom Street)
Pacific Coast Steel Company
(Hunter-Dulin Building)
Pacific Electric Manufacturing Corporation
(5815 Third Street)
The Pelton Water Wheel Company
(Nineteenth and Harrison Streets)

Connecticut

Ansonia—The Ansonia Electrical Company.
Branford—Malleable Iron Fittings Company
(Pole Hardware Department)
Bridgeport—Bryant Electric Company.
Harvey Hubbell, Incorporated.
Reading Steel Casting Company, Inc.
(929 Connecticut Avenue)
Hartford—Colt's Patent Fire Arms Manufacturing Company
(Electrical Division)
The Hart Manufacturing Company
(Hamilton Street)
The States Company
(19 New Park Avenue)

(Class D Members Continued)

Meriden—Manning Bowman & Company
(200 Fifth Avenue, New York, N. Y.)
The Miller Company
(99 Center Street)
New Britain—Landers, Frary & Clark.
New Haven—The Acme Wire Company
(P. O. Drawer 1820)
The Bigelow Company
(P. O. Drawer 706)
The National Electric Condenser Company
(Box 1820)
Products Protection Corporation
(P. O. Box 904)
Rockbestos Products Corporation
(P. O. Box 1102)
Whirldry Corporation, c/o Winchester Repeating Arms Company.
Plainville—The Trumbull Electric Manufacturing Company.
Torrington—The Fitzgerald Manufacturing Company.
Waterbury—The American Brass Company, c/o Anaconda Copper Mining Company
(25 Broadway, New York, N. Y.)
The Beardsley & Wolcott Manufacturing Company.
The Bristol Company.
Scovill Manufacturing Company.

Delaware

Edgemoor—Edgemoor Iron Company.

Florida

Jacksonville—American Cross Arms Company, Inc.
(P. O. Box 82)

Illinois

Aurora—Standard Gas Equipment Corporation
(Acorn Division)
Chicago—American Insulated Wire Division of General Cable Corporation
(954 West Twenty-first Street)
American Ironing Machine Company
(100 East Ohio Street)
Anaconda Copper Mining Company, Rolling Mills Department
(111 West Washington Street)
Automatic Burner Corporation
(312 North May Street)
Beardslee Chandelier Manufacturing Company
(216-20 South Jefferson Street)
Benjamin Electric Manufacturing Company
(128 South Sangamon Street)
Chicago Flexible Shaft Company
(5600 West Roosevelt Road)
Chicago-Jefferson Fuse & Electric Company
(Laflin and Fifteenth Street)
Clements Manufacturing Company
(601-613 Fulton Street)
Conlon Corporation
(Fifty-second Avenue and Nineteenth Street)
Continental Valve & Equipment Company
(82 Herbert Street, Farmingham, Mass.)
Crane Company
(836 South Michigan Avenue)
Crane Packing Company
(1800 Cuyler Avenue)
Curtis Lighting, Incorporated
(1119 West Jackson Boulevard)
Delta Star Electric Company
(2433-2443 Fulton Street)
Economy Fuse & Manufacturing Company
(Greenview Avenue at Diversey Parkway)
Edison Electric Appliance Company, Inc.
(5660 West Taylor Street)
Electric Furniture Corporation
(154 East Erie Street)
Federal Electric Company, Inc.
(8700 South State Street)
G. & W. Electric Specialty Company
(7780 Dante Avenue, Grand Crossing Station)
Hurley Machine Company
(Division of Electric Household Utilities Corporation, West Twenty-second Street and Fifty-fourth Avenue)
Mathias Klein & Sons
(3200 Belmont Avenue)
Kulp Theft Proof Lamp Company
(330 South Wells Street)
MacMarquiz
(4821 Sheridan Road)
The Mercoid Corporation
(25 Church Street, Room 307, New York, N. Y.)
Metal Specialties Manufacturing Company
(338-352 North Kedzie Avenue)
Minerallac Electric Company
(25 North Peoria Street)
Naugle Pole & Tie Company
(5 South Wabash Avenue)
Reynolds Electric Company
(2650 West Congress Street)
Royal Electric Manufacturing Company
(619-621 East Fortieth Street)
W. H. Salisbury & Company, Inc.
(308 West Madison Street)
Schweitzer & Conrad, Inc.
(4431-4439 Ravenswood Avenue)
Standard Oil Company of Indiana
(Technical Division, Lubricating Department, 910 South Michigan Avenue)

(Class D Members Continued)

Triplex Washing Machine Corporation
(644 West Lake Street)
Van Cleef Bros.
(Woodlawn Avenue, Seventy-seventh to Seventy-eighth Streets)
Victor X-Ray Corporation
(2012 Jackson Boulevard)
Walker Vehicle Company
(Eighty-seventh and State Streets, Chesterfield Station)
Harvey—The Buda Company.
Macomb—Illinois Electric Porcelain Company
(512 North Pearl Street)
Peoria—Altorfer Brothers Company.
Rockford—Geo. D. Roper Corporation.
Springfield—Sangamo Electric Company.
Springfield Boiler Company
(1901 East Capital Avenue)
Sycamore—Inland Wire & Cable Company.
Taylorville—Tip's Tool Company, Inc.

Indiana

Brazil—The Clay Products Company.
East Chicago—Edward Valve & Manufacturing Company
(1200 West 145th Street)
Evansville—Servel, Incorporated.
Gary—Walter Bates Steel Corporation.
Indianapolis—Transelectric Company
(518 Traction Terminal Building)
Lafayette—Duncan Electric Manufacturing Company.
Marion—Ruternber Electric Company.
South Bend—South Bend Current Controller Company.

Iowa

Council Bluffs—Giant Manufacturing Company.
Newton—Automatic Electric Washer Company, Inc.; One Minute Manufacturing Company.

Kentucky

Covington—The Wadsworth Electric Manufacturing Company, Inc.

Maine

Portland—Brown Company
(Fibre Conduit Department)

Maryland

Baltimore—Baltimore Copper Mills
(P. O. Highlandtown Branch)
Locke Insulator Corporation
(Maryland Trust Company Building)
May Oil Burner Corporation
(3500 East Biddle Street)

Massachusetts

Ashland—Warren Telechron Company.
Boston—Albert & J. M. Anderson Manufacturing Company
(289-305 A Street)
Bernitz Furnace Appliance Company
(80 Federal Street)
Condit Electrical Manufacturing Corporation
(838 Summer Street)
The Dampney Company of America
(50-60 Business Street, Hyde Park)
Holtzer-Cabot Electric Company
(125 Amory Street, Roxbury)
Simplex Wire & Cable Company
(201 Devonshire Street)
B. F. Sturtevant Company
(Hyde Park)
Walker & Pratt Manufacturing Company
(31-35 Union Street)
Walworth Company
(Statler Building)
Wheeler Reflector Company
(275 Congress Street)
Medford Hillside—Doble Engineering Company.
Springfield—American Electric Service & Maintenance Company.
Waltham—The Palmer Electric & Manufacturing Company.
Watertown—Hood Rubber Company.
Worcester—American Steel & Wire Company
(94 Grove Street)
Devon Manufacturing Company
(677 Calbridge Street)
Riley Stoker Corporation
(9 Neponset Street)
M. S. Wright Company
(164 Fremont Street)

Michigan

Battle Creek—Opalume Division of Consolidated (Electric Sign Corporation)
H. B. Sherman Manufacturing Company
(9 Barney Street)
Bay City—Kuhlman Electric Company.
Detroit—American Airdry Corporation
(2587 East Grand Boulevard)
American Electrical Heater Company.
Bartlett Manufacturing Company
(743 Beaubien Street)
Burroughs Adding Machine Company
(6071 Second Boulevard)
Copeland Products, Incorporated
(630 Lycaste Avenue)
Diamond Power Specialty Corporation
(10340 Oakland Avenue)

(Class D Members Continued)

Eureka Vacuum Cleaner Company
(Hamilton and Dewey Avenues)
Ironrite Ironer Company
(38 Piquette Avenue)
Kelvinator Corporation
(14250 Plymouth Road)
Knott & Garllus Company
(3945-3951 "A" Street)
Lineman Protector Company
(2008 Penobscot Building)
McCord Radiator & Manufacturing Corporation
(2587 East Grand Boulevard)
The Peninsula-Stove Company
(1417 Fort Street West)
Square D Company
(6060 Rivard Street)
Grand Rapids—Leonard Division of Kelvinator Corporation
(Clyde Park Avenue)
Jackson—Reynolds Spring Company
(North East Avenue)
St. Joseph—Upton Machine Company.
Wayne—Deceleco, Inc.

Minnesota

Minneapolis—B. J. Carney & Company
(100 North Seventh Street)
Electric Machinery Manufacturing Company
(1331 N. E. Tyler Street)
National Pole & Treating Company
(1100 Builders Exchange Building)
The Valentine-Clark Company
(Box 1797)
Waters-Genter Company
(213 N. Second)
St. Paul—Bohn Refrigerator Company
(1350 University Avenue)
Seeger Refrigerator Company
(Arcade-Wells-Whitehall Streets)

Missouri

Centralia—Chance Company.
St. Louis—Century Electric Company
(1827 Pine Street)
Electrol, Incorporated
(170 Dorcas Street)
Emerson Electric Manufacturing Company
(2018 Washington Avenue)
The Edwin F. Guth Company
(2615 Washington Avenue)
Heine Boiler Company
(5319 Shreve Avenue)
James R. Kearney Corporation
(4334 Clayton Avenue)
W. N. Matthews Corporation
(3722 Forest Park)
Moloney Electric Company
(5390 Kingshighway, N. W.)
St. Louis Malleable Casting Company
(7701 N. Conduit Avenue)
Wagner Electric Corporation
(6400 Plymouth Avenue)

Nebraska

Omaha—Clark Electric Water Heater
(Division of McGraw Electric Company. 13th and Capital Avenue)

New Hampshire

Laconia—Laconia Car Company.

New Jersey

Garwood—Diamond Expansion Bolt Company.
Gloucester City—Welsbach Company.
Harrison—Driver-Harris Company; Edison Lamp Works of General Electric Company.
Hoboken—Cooper-Hewitt Electric Company
(410 Eighth Street)
Newark—American Transformer Company
(178-182 Emmet Street)
Baker and Company, Inc.
(54 Austin Street)
Weston Electrical Instrument Corporation
(614 Frelinghuysen Avenue)
Orange—Thomas A. Edison, Inc.
(Special Sales Department)
Edison Storage Battery Company
Passaic—The Okonite Company.
(501 Fifth Avenue, New York, N. Y.)
The Okonite-Callender Cable Co., Inc.
(501 Fifth Avenue, New York, N. Y.)
Trenton—Circle F Manufacturing Company; De Laval Steam Turbine Company; Imperial Porcelain Works.

New York

Albany—Hynes & Cox Electric Corporation
(406 N. Pearl Street)
Beacon—The Green Fuel Economizer Company.
Buffalo—Handi Appliance Corporation
(33 Chandler Street)
Savory, Inc.
(90 Alabama Street)
Corning—Corning Glass Works.
Johnson City—Central Flatiron Manufacturing Company.
LeRoy—Lapp Insulator Company, Inc.
Lima—The Porcelain Insulator Corporation.
Mount Vernon—Ward Motor Vehicle Company
(South Fulton Avenue)

(Class D Members Continued)

Brooklyn—Gleason-Tiebout Glass Company
(99 Commercial Street)
Lackner Products Corporation
(135 Luqueer Street)
Metropolitan Device Corporation
(1250 Atlantic Avenue)
Albert Whale Company, Inc.
(Metropolitan and Morgan Avenues)

Manhattan—Alberne Stone Company
(153 West 23rd Street)
American Brown Boveri Electric Corporation
(Graybar Building, 420 Lexington Avenue)
American Flexible Shaft Manufacturing Corporation
(331 Madison Avenue)
The Babcock & Wilcox Company
(85 Liberty Street)
Bakelite Corporation
(247 Park Avenue)
Bishop Wire & Cable Corporation
(420 East 25th Street)
Borne Scrymser Company
(Whitehall Building, 17 Battery Place)
Burndy Engineering Company, Inc.
(10 East 43rd Street)
Claude Neon Lights, Inc.
(50 East 42nd Street)
Combustion Engineering Corporation
(200 Madison Avenue)
Consolidated Ashcroft Hancock Company, Inc.
(100 East 42nd Street)
Curtin-Howe Corporation
(11 Park Place)
Davis Emergency Equipment Company, Inc.
(67 Wall Street)
De Jur Products Company
(199 Lafayette Street)
The De Laval Separator Company
(165 Broadway)
Dossert & Company
(242 West 41st Street)
Bubilier Condenser Corporation
(10 East 43rd Street)
The Engineer Company
(17 Battery Place)
The Engineering Products Corporation, Inc.
(25 Church Street)
Foster Wheeler Corporation
(165 Broadway)
Furnace Engineering Company, Inc.
(200 Madison Avenue)
General Office Equipment Corporation
(342 Madison Avenue)
Gould Storage Battery Company, Inc.
(250 Park Avenue)
Graybar Electric Company, Inc.
(Lexington Avenue and 43rd Street)
A. H. Grebe & Company, Inc.
(109 West 57th Street)
The Griscom-Russell Company
(285 Madison Avenue)
Habirshaw Cable & Wire Corporation
(233 Broadway)
Holophane Company, Inc.
(342 Madison Avenue)
Ingersoll Rand Company (A. S. Cameron Steam Pump Works)
(11 Broadway)
The International Nickel Company
(67 Wall Street)
Johns-Manville Corporation
(Madison Avenue and 41st Street)
Kerite Insulated Wire & Cable Company
(30 Church Street)
Walter Kidde & Company, Inc.
(140 Cedar Street)
Lightolier Company
(569 Broadway)
Mica Insulator Company
(200 Varick Street)
National Electric Products Corporation
(233 Broadway)
Noma Electric Corporation
(340 Hudson Street)
O. B. Electric Truck, Inc.
(578-82 Washington Street)
Otis Elevator Company
(260 11th Avenue)
Peerless Insulated Wire & Cable Company
(30 Church Street)
The Permutit Company
(440 4th Avenue)
The Portable Light Company, Inc.
(12 Warren Street)
Radio Corporation of America
(233 Broadway)
The Rawlplug Company, Inc.
(66 West Broadway)
Research Corporation
(25 West 43rd Street)
Safety Cable Company
(420 Lexington Avenue)
Serelco, Inc.
(420 Lexington Avenue)
Smoot Engineering Corporation
(136 Liberty Street)
Standard Oil Company of New Jersey
(26 Broadway)
The Superheater Company
(17 East 42nd Street)
Tabulating Machine Company
(50 Broad Street)
The R. Thomas & Sons Company
(30 Church Street)

(Class D Members Continued)

Seth Thomas Clock Company
(19 West 44th Street)
Vacuum Oil Company
(61 Broadway)
Waterbury Cable Service, Inc.
(342 Madison Avenue)
Western Electric Company, Inc.
(195 Broadway)
Westinghouse Commercial Investment Company
(150 Broadway)
Westinghouse Electric International Company
(150 Broadway)
Westinghouse Lamp Company
(150 Broadway)
Worthington Pump & Machinery Corporation
(2 Park Avenue)
York Insulated Wire Works of General Electric Company
(1737 Broadway)
Long Island City—The Frink Corporation
(23-10 Bridge Plaza, South)
Irving Iron Works Company
(Third and Creek Streets)
Memco Engineering & Manufacturing Company, Inc.
(381 Hamilton Street)
Morganite Brush Company, Inc.
(3302-3320 Anable Avenue)
Niagara Falls—Globar Corporation (P. O. 618)
Orchard Park—Park Metalware Company, Inc.
(Thorne Avenue and Bank Street)
Port Jervis—Gillinder Brothers.
Poughkeepsie—Hoe Corporation.
Rochester—North East Electric Company
(379 Lyell Avenue)
Rainbow Appliance Corporation
(11-27 Hand Street)
Robeson-Rochester Corporation
(176 Anderson Avenue)
Samson Cutlery Company
(10 Jones Street)
Rome—Rome Wire Company.
Schenectady—General Electric Company; International General Electric Company, Inc.
Solvay—Pass & Seymour, Inc.
Syracuse—Archbold-Brady Company.
Utica—American LaFrance and Foamite Ind., Inc.; Savage Arms Corporation.
(100 East 42nd St., New York, N. Y.)
Wellsville—The Air Preheater Corporation.

Ohio

Canton—Nelson & Kuemmerling
(718 Brant Building)
Superior Iceless Refrigerator, Inc.
The Superior Switchboard & Devices Company
(420 Schroyer Avenue)
The Union Metal Manufacturing Company
(Maple Avenue)
The United Electric Company
(Eighth Street, N. E.)
Cincinnati—Logan County Coal Corporation
(2111 Union Central Building)
The Lunkenheimer Company
Cleveland—The Apex Electrical Manufacturing Company.
Bailey Meter Company
(1050 Ivanhoe Road)
Electric Vacuum Cleaner Company, Inc.
(Euclid Avenue and Ivanhoe Road)
The P. A. Geier Company
(540 East 105th Street)
The Liberty Gauge & Instrument Company
(6612 Euclid Avenue)
National Carbon Company, Inc.
(West 117th Street and Madison Avenue)
National Lamp Works of General Electric Company
(NELA Park)
Columbus—The International Derrick & Equipment Company
(875 Michigan Avenue)
Dayton—Frigidaire Corporation
(Third National Bank Building)
Dover—The Dover Manufacturing Company.
Gettysburg—Ira M. Petersime & Son.
Hamilton—The Estate Stove Company.
Lockland—The Philip Carey Company.
Mansfield—Ohio Brass Company.
Westinghouse Electric & Manufacturing Company
(Mansfield Works)
Minerva—The American Electric Switch Corporation.
North Canton—The Hoover Company.
Sidney—Prima Manufacturing Company.
Toledo—The Standard Electric Stove Company
(1712-1720 North 12th Street)
The Swartzbaugh Manufacturing Company
Vermilion—The F. W. Wakefield Brass Company.
Youngstown—Truscon Steel Company
(Pole Line Hardware Department)

Pennsylvania

Ambler—Asbestos Shingle Slate & Sheathing Company.
Beaver Falls—Keystone Refrigerating Corporation.
Charleroi—Macbeth-Evans Glass Company.
East Pittsburgh—Westinghouse Electric & Manufacturing Company.
Erie—Erie City Iron Works.

(Class D Members Continued)

Fullerton—Fuller Lehigh Company.
Glassport—Copperweld Steel Company.
Greensburg—Railway & Industrial Engineering Company.
Jeannette—Elliott Company.
Norristown—Franklin Air Compressor Corporation.
Philadelphia—The Allen-Sherman-Hoff Company
(225 South 15th Street)
American Engineering Company
Andale Company
(1600 Arch Street)
Atwater Kent Manufacturing Company
(4700 Wissahickson Avenue)
R. H. Beaumont Company
(319 Arch Street)
James G. Biddle
(1211-13 Arch Street)
Decorative Lamp & Shade Company
(1217-33 Spring Garden Street)
J. Struthers Dunn
(1130 Race Street)
Electric Power Equipment Corporation
(412-420 North 16th Street)
Electric Service Supplies Company
(17th and Cambria Streets)
The Electric Storage Battery Company
(19th Street and Allegheny Avenue)
Franklin Development Company, Inc.
(108 Walnut Street)
Hall Electric Heating Company, Inc.
(1429 Walnut Street)
I.-T.-E. Circuit Breaker Company
(501 North 19th Street)
Kingsbury Machine Works, Inc.
(4320 Tackawanna Street, Frankford)
Leeds & Northrup Company
(4901 Stenton Avenue)
I. P. Morris & De La Vergne, Inc.
(Richmond and Norris Streets)
Murlin Manufacturing Company
(5420 Paschall Avenue)
Philadelphia Electrical & Manufacturing Company
(1228 North 31st Street)
Philadelphia Storage Battery Company
(Ontario and C Streets)
Roberts & Mander Stove Company
(11th Street and Washington Avenue)
The Sharples Specialty Company
(23rd and Westmoreland Streets)
C. H. Wheeler Manufacturing Company
(Lehigh and Sedgley Avenues)
Wright Appliance Company
(2109 Market Street)
Pittsburgh—Aluminum Company of America
(2400 Oliver Building)
Blaw-Knox Company
(P. O. Box 915)
Gainaday Electric Company
(P. O. Box 1236)
Hubbard & Company
(Granite Building)
Ladd Water Tube Boiler Company
(1606 First National Bank Building)
Mine Safety Appliances Company
(Braddock, Thomas and Meade)
National Valve & Manufacturing Company
(Arsenal Station)
R. D. Nuttall Company
(McCandless Avenue and Harrison Street)
Oliver Iron & Steel Corporation
(South Tenth and Muriel Streets)
The Phoenix Glass Company
(230 Fifth Avenue, New York, N. Y.)
Pittsburgh Reflector Company
(Third Avenue & Ross Street)
Riter-Conley Company
(318 Oliver Building)
Seyler Manufacturing Company
(Sharpsburg Post Office)
Standard Underground Cable Company
(S. W. Corner 17th and Pike Streets)
P. Wall Manufacturing Supply Company
(30 Church Street, New York, N. Y.)
Pottstown—Automatic Electric Heater Company.
Wilkes-Barre—Hazard Insulated Wire Works
(Division of The Okonite Company)

Rhode Island

Pawtucket—Tubular Woven Fabric Company
Providence—American Electrical Works

Texas

Orange—Texas Cresoting Company

Virginia

Newport News—Newport News Shipbuilding & Dry Dock Company
Waynesboro—W. J. Loth Stove Company, Inc.

Washington

Spokane—Electro Kold Corporation
(S. 151 Post Street)

West Virginia

Follansbee—The Jefferson Glass Company
Huntington—The Armstrong Electric and Manufacturing Corporation
Kenova—Champion Switch Company; Jeffery-Dewitt Insulator Company

(Class D Members Continued)

Wisconsin

Beaver Dam—Malleable Iron Range Company
Clintonville—Four Wheel Drive Auto Company
Madison—Hankscraft Company
(121 North Dickinson Street)
Milwaukee—Allen-Bradley Company
(494 Reed Street)
Allis-Chalmers Manufacturing Company
The Cutler-Hammer Manufacturing Company
(P. O. 1564)
A. J. Lindemann & Hoverson Company
(1st and Cleveland Avenues)
The MacGillis & Gibbs Company
(1201 Wells Building)
Nordberg Manufacturing Company
South Milwaukee—Line Material Company
(Railroad Tr. and Michigan Avenue)
Two Rivers—Metal Ware Corporation

CANADA

Ontario

Galt—Babcock-Wilcox & Goldie-McCulloch, Ltd.
Hamilton—Boston Insulated Wire & Cable Company, Ltd.; Canadian Porcelain Company, Ltd., Canadian Westinghouse Company, Ltd.; The Hoover Company, Ltd.; N. Slater Company, Ltd.; Standard Underground Cable Company of Canada, Ltd.
(Sherman Avenue, North)
London—Kelvinator of Canada, Ltd.
Niagara Falls—Canadian Ohio Brass Company, Ltd.
Pembroke—Superior Electrics, Ltd.
Renfrew—Renfrew Electric Products, Ltd.
St. Catharines—Packard Electric Company
(Care of Packard Company, Ltd.)
Scarboro Junction—Canadian Line Materials, Ltd.
Toronto—The Aluminum Company of Canada
(1307 Bank of Hamilton Building)
The British Aluminum Company, Ltd.
(380-382 Adelaide Street, West)
Canada Wire & Cable Company
(Box 518)
Canadian General Electric Company
(212 King Street, West)
Canadian National Carbon Company, Ltd.
(805 Davenport Road)
Dominion Cutout Company
(250 Richmond Street, West)
Eastern Power Devices, Ltd.
(124 Richmond Street, West)
English Electric Company of Canada, Ltd.
(Northern Ontario Building)
Ferranti Electric, Ltd.
(26 Noble Street)
The Holophane Company, Ltd.
(385 Yonge Street)
Lincoln Meter Company, Inc.
(72 Stafford Street)
Moloney Electric Company of Canada
Sangamo Electric Company of Canada, Ltd.
(183 George Street)
Square D Company of Canada, Ltd.
(146 King Street, West)

Quebec

Montreal—Benjamin Electric Manufacturing Company of Canada, Ltd.
(New Birks Building)
Canadian Laco Lamps, Ltd.
(1511 St. James Street)
The Devoe Electric Switch Company
(872 Notre Dame Street, West)
Dominion Engineering Works, Ltd.
Economy Fuse & Manufacturing Company of Canada
(Unity Building)
Elpeco of Canada, Ltd.
(1497-99 Notre Dame Street, East)
Frigidaire Corporation
(966 St. Catherine, West)
General Steel Wares, Ltd.
(23 Wellington Street)
Northern Electric Company, Ltd.
(121 Shearer Street)
Eugene F. Phillips Electrical Works, Ltd.
(P. O. Box 729)
The Premier Vacuum Cleaner Company, Ltd.
(Keefer Building)
St. Johns—Hart Battery Company, Ltd.

(Class F, Associate Companies, and Class H, Foreign Members, will appear next month)

A young salesman was seen to turn away from a prospective buyer of an electric washing machine, a disgusted look on his face.

"She doesn't want an electric washing machine," the young man said. "I explained just how to operate it, turned on the current, and showed her how it works, and finally she pointed to the hole in the bottom and asked:

"What is that for?"

"To let the water out," I said.

"Oh, then it doesn't wash by electricity, does it, you have to use water?"—Exchange.

Twice as Strong

(Continued from page 67)

duals, so marked that they were noticed generally. The morale and *esprit de corps* has been improved, and unquestionably our employees are more 'customer minded' and are putting more spirit and enthusiasm in their customer contacts."

The effect of this attitude was shown in the reaction of customers. With surprising frequency they voluntarily reported instances of unusual courtesy shown them by employees, and otherwise demonstrated their increased friendliness to the company.

The details of the plan employed by this company will undoubtedly interest others.

List of Member Companies

It has been customary in the past to publish annually in booklet form a list of member companies of the National Electric Light Association. It is planned henceforth, and beginning with this issue, to publish this list once each year in the N. E. L. A. Bulletin instead of in the booklet form. A sufficient number of extra copies of the Bulletin will be printed to supply any reasonable demand for the list.

Correction

The following table of District Brightness Factors, inadvertently omitted, should appear on page 64 of the Electrical Advertising Committee Serial Report, "Symposium on Electrical Advertising" (N. E. L. A. Publication No. 289-9).

Description of District	Factor
Extremely bright centers such as Times Square, New York City, and State Street, Chicago	1
Very bright centers in large cities, such as Cadillac Square, Detroit; Playhouse Square, Cleveland...........	2
Bright squares in large cities.........	3
White Ways in large cities. Squares in small cities	4
Business districts (not White Way) in large cities. White Ways in smaller cities	5
Business districts in small cities. Outlying districts in large cities........	6
Centers of small towns. Outlying districts of small cities...............	7
Dark outlying districts with an occasional lighted display	8
Lighted highways, no display lighting.	9
A single isolated display, no street lighting or store windows...........	10

The report had been mailed to member companies and committee members before the omission was discovered. A correction slip has been mailed to the same list.

OFFICERS—DIVISIONS—SECTIONS—BUREAUS—COMMITTEES—CONVENTIONS—MEETINGS—NEW MEMBERS

NATIONAL EXECUTIVE COMMITTEE

Officers

President, P. S. Arkwright
Georgia Power Co., Atlanta, Ga.

Vice-President, M. S. Sloan
The New York Edison Co., New York, N. Y.

Vice-President, W. A. Jones
Henry L. Doherty & Co., New York, N. Y.

Vice-President, J. F. Owens
Oklahoma Gas & Electric Co., Oklahoma City, Okla.

Vice-President, Marshall E. Sampsell
Central Illinois Public Service Co., Chicago, Ill.

Treasurer, P. S. Young
Public Service Electric & Gas Co., Newark, N. J.

Managing Director, Paul S. Clapp
National Electric Light Association, New York, N. Y.

Secretary, A. Jackson Marshall
National Electric Light Association, New York, N. Y.

Members-at-Large

(*Term expiring June 30th,* 1929)

H. T. Sands, *Ex Officio,* Electric Bond & Share Co., New York, N. Y.

C. L. Collens, Reliance Electric & Manufacturing Co., Cleveland, Ohio

G. E. Cullinan, Graybar Electric Co., Inc., New York, N. Y.

E. W. Lloyd, Commonwealth Edison Co., Chicago, Ill.

Harry Reid, National Electric Power Co., New York, N. Y.

James R. Strong, Tucker Electrical Construction Co., New York, N. Y.

(*Term expiring June 30th,* 1930)

D. C. Barnes, Stone & Webster, Inc., Boston, Mass.

H. P. Liversidge, The Philadelphia Electric Co., Philadelphia, Pa.

Gerard Swope, General Electric Co., New York, N. Y.

(*Term expiring June 30th,* 1931)

John P. Coghlan, Pacific Gas & Electric Co., San Francisco, Cal.

H. M. Edwards, The New York Edison Co., New York, N. Y.

E. M. Herr, Westinghouse Electric & Manufacturing Co., New York, N. Y.

National Section Chairmen

Accounting—John F. Ford, The Philadelphia Electric Co., Philadelphia, Pa.

Commercial—Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

Engineering—E. C. Stone, Duquesne Light Co., Pittsburgh, Pa.

Public Relations—J. F. Owens, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

Geographic Division Presidents

Canadian—P. S. Gregory, Shawinigan Water & Power Co., Montreal, Canada

Eastern—F. R. Phillips, Duquesne Light Co., Pittsburgh, Pa.

East Central—C. S. MacCalla, Pennsylvania-Ohio Power & Light Co., Youngstown, Ohio

Great Lakes—J. E. Johnson, Illinois Power & Light Corp., Chicago, Ill.

Middle West—Ralph T. Smalley, Kansas Electric Power Co., Lawrence, Kan.

New England—Irvin W. Day, The Connecticut Light & Power Co., Waterbury, Conn.

North Central—L. M. Pharis, Minnesota Power & Light Co., Duluth, Minn.

Northwest—R. M. Boykin, Puget Sound Power & Light Co., Seattle, Wash.

Pacific Coast—Paul M. Downing, Pacific Gas & Electric Co., San Francisco, Cal.

Rocky Mountain—Clare N. Stannard, Public Service Co. of Colorado, Denver, Colo.

Southeastern—C. A. Collier, Georgia Power Co., Atlanta, Ga.

Southwestern—J. G. Holtzclaw, Gulf States Utilities Co., Beaumont, Tex.

PUBLIC POLICY COMMITTEE

Chairman, R. H. Ballard, Southern California Edison Co., Los Angeles, Cal.

Vice-Chairman, W. W. Freeman, Columbia Gas & Electric Corp., New York, N. Y.

P. S. Arkwright, Georgia Power Co., Atlanta, Ga.

Henry G. Bradlee, Stone & Webster, Inc., Boston, Mass.

N. F. Brady, The New York Edison Co., New York, N. Y.

B. C. Cobb, Allied Power & Light Corp., New York, N. Y.

Frank L. Dame, The North America Co., New York, N. Y.

J. E. Davidson, Nebraska Power Co., Omaha, Neb.

Henry L. Doherty, Henry L. Doherty & Co., New York, N. Y.

Alex Dow, The Detroit Edison Co., Detroit, Mich.

Charles L. Edgar, The Edison Electric Illuminating Co., Boston, Mass.

Halford Erickson, Byllesby Engineering & Management Corp., Chicago, Ill.

P. G. Gossler, Columbia Gas & Electric Corp., New York, N. Y.

A. R. Graustein, International Paper Co., New York, N. Y.

Franklin T. Griffith, Portland Electric Power Co., Portland, Ore.

C. E. Groesbeck, Electric Bond & Share Co., New York, N. Y.

Edwin Gruhl, The North American Co., New York, N. Y.

A. F. Hockenbeamer, Pacific Gas & Electric Co., San Francisco, Cal.

Martin J. Insull, Middle West Utilities Co., Chicago, Ill.

Samuel Insull, Commonwealth Edison Co., Chicago, Ill.

Walter H. Johnson, The Philadelphia Electric Co., Philadelphia, Pa.

W. A. Jones, Henry L. Doherty & Co., New York, N. Y.

John W. Lieb, The New York Edison Co., New York, N. Y.

Thomas W. Martin, Alabama Power Co., Birmingham, Ala.

Thomas N. McCarter, Public Service Electric & Gas Co., Newark, N. J.

John B. Miller, Southern California Edison Co., Los Angeles, Cal.

Sidney Z. Mitchell, Electric Bond & Share Co., New York, N. Y.

Thomas E. Murray, The New York Edison Co., New York, N. Y.

J. J. O'Brien, H. M. Byllesby & Co., Chicago, Ill.

J. F. Owens, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

R. F. Pack, Northern States Power Co., Minneapolis, Minn.

A. W. Robertson, Westinghouse Electric & Manufacturing Co., New York, N. Y.

Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

H. T. Sands, Electric Bond & Share Co., New York, N. Y.

Paul A. Schoellkopf, The Niagara Falls Power Co., Niagara Falls, N. Y.

M. S. Sloan, The New York Edison Co., New York, N. Y.

Frank W. Smith, The United Electric Light & Power Co., New York, N. Y.

R. P. Stevens, Allied Power & Light Corp., New York, N. Y.

Frank M. Tait, The Dayton Power & Light Co., Dayton, Ohio.

A. W. Thompson, The United Gas Improvement Co., Philadelphia, Pa.

George N. Tidd, American Gas & Electric Co., New York, N. Y.

Herbert A. Wagner, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

Owen D. Young, General Electric Co., New York, N. Y.

Public Relations National Section Representatives

John F. Gilchrist, Commonwealth Edison Co., Chicago, Ill.

T. A. Kenney, Allied Power & Light Corp., New York, N. Y.

Guy W. Talbot, Pacific Power & Light Co., Portland, Ore.

GEOGRAPHIC DIVISIONS STATE ASSOCIATIONS

CANADIAN DIVISION

(*Entire Dominion of Canada*)

Canadian Electrical Association

President, P. S. Gregory, The Shawinigan Water & Power Co., Montreal, Can.; *Secretary,* H. M. Lyster, Room 712, Power Bldg., Montreal, Can.

(*This Division Has No State [Provincial] Section*)

*EASTERN DIVISION

(*New Jersey, New York, Pennsylvania*)

President, F. R. Phillips, Duquesne Light Co., Pittsburgh, Pa.; *Managing Director,* A. B. Millar, Telegraph Bldg., Harrisburg, Pa.

Empire State Gas and Electric Association

President, Charles S. Ruffner, Mohawk-Hudson Power Corp., Albany, N. Y.; *Secretary,* Charles H. B. Chapin, 5618 Grand Central Terminal Bldg., New York, N. Y.

New Jersey Electric Association

President, C. H. Howell, Atlantic City Electric Co., Atlantic City, N. J.; *Secretary,* S. F. Delany, Atlantic City Electric Co., Atlantic City, N. J.

Pennsylvania Electric Association

President, F. R. Phillips, Duquesne Light Co., Pittsburgh, Pa.; *Managing Director,* A. B. Millar, Telegraph Bldg., Harrisburg, Pa.

EAST CENTRAL DIVISION

(*Kentucky, Ohio, West Virginia*)

President, C. S. MacCalla, Pennsylvania-Ohio Power & Light Co., Youngstown, Ohio; *Secretary-Treasurer,* D. L. Gaskill, 603½ Broadway, Greenville, Ohio.

Kentucky Association of Public Utilities

President, Samuel Riddle, Louisville Railway Co., Louisville, Ky.; *Secretary,* E. F. Kelly, Louisville Railway Co., Louisville, Ky.

Public Utilities Association of West Virginia

President, A. C. Spurr, Wheeling Traction Co., Wheeling, W. Va.; *Secretary,* A. Bliss McCrum, Box 1483, Charleston, W. Va.

GREAT LAKES DIVISION

(*Illinois, Indiana, Michigan, Wisconsin*)

President, J. E. Johnson, Illinois Power & Light Corp., Chicago, Ill.; *Secretary,* Tom C. Polk, 910 Marquette Bldg., Chicago, Ill.

Illinois State Electric Association

President, Julius L. Hecht, Public Service Co. of Northern Illinois, Chicago, Ill.; *Secretary-Treasurer,* Tom C. Polk, 910 Marquette Bldg., Chicago, Ill.

Indiana Electric Light Association

President, Norman A. Perry, Indianapolis Power & Light Co., Indianapolis, Ind.; *Secretary-Treasurer,* William Stokes, 1548 Consolidated Bldg., Indianapolis, Ind.

Michigan Electric Light Association Section

President, Howard Pett, Consumers Power Co., Jackson, Mich.; *Secretary-Treasurer,* Herbert Sylvester, The Detroit Edison Co., Ann Arbor, Mich.

Wisconsin Utilities Association

President, C. R. Phenicie, Wisconsin Public Service Corp., Green Bay, Wis.; *Executive Secretary,* John N. Cadby, Room 203, University Bldg., 432 Broadway, Milwaukee, Wis.

*MIDDLE ATLANTIC DIVISION

(*To Consist of Delaware, District of Columbia, Maryland, Virginia*)

Maryland Utilities Association

President, H. T. Connolly, Washington, Baltimore & Annapolis Electric Railroad Company, Baltimore, Md.; *Secretary,* D. E. Kinnear, United Railways & Electric Company, Baltimore, Md.

Public Utilities Association of Virginia

President, A. W. Higgins, Virginia Public Service Co., Charlottesville, Va.; *Secretary,* A. B. Tunis, 301 East Grace Street, Richmond, Va.

MIDDLE WEST DIVISION

(Iowa, Kansas, Missouri, Nebraska)

President, RALPH T. SMALLEY, Kansas Electric Power Co., Lawrence, Kan.; *Managing Director*, THORNE BROWNE, 1527 Sharp Bldg., Lincoln, Neb.

Iowa Section

President, C. S. MACY, Iowa Power & Light Co., Adel, Iowa; *Secretary-Treasurer*, H. E. WEEKS, Tri-City Railway & Light Co., Davenport, Iowa.

Kansas Section

President, FRANK M. STONE, Kansas Utilities Co., Fort Scott, Kan.; *Secretary*, H. LEE JONES, 820 Kansas Avenue, Topeka, Kan.

Missouri Association of Public Utilities

President, A. E. REYNOLDS, Springfield Gas & Electric Co., Springfield, Mo.; *Secretary-Treasurer*, F. D. BEARDSLEE, 315 North Twelfth Street, St. Louis, Mo.

Nebraska Section

President, C. W. AMIDON, Central Power Co., Grand Island, Neb.; *Managing Director*, THORNE BROWNE, 1527 Sharp Bldg., Lincoln, Neb.

NEW ENGLAND DIVISION

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)

President, IRVIN W. DAY, The Connecticut Light & Power Co., Waterbury, Conn.; *Secretary*, MISS O. A. BURSIEL, Room 1113 Statler Bldg., 20 Providence Street, Boston, Mass.

(This Division Has No State Sections)

NORTH CENTRAL DIVISION

(Minnesota, North Dakota, South Dakota)

North Central Electric Association

President, L. M. PHARIS, Minnesota Power & Light Co., Duluth, Minn.; *Secretary*, JOHN W. LAPHAM, 803-804 Plymouth Bldg., Minneapolis, Minn.

(This Division Has No State Sections)

NORTHWEST DIVISION

(Alaska, Idaho, Montana, Oregon, Utah, Washington)

Northwest Electric Light and Power Association

President, R. M. BOYKIN, Pudget Sound Power & Light Co., Seattle, Wash.; *Secretary*, BERKELEY SNOW, Room 1206, Spaulding Bldg., Portland, Ore.

(This Division Has No State Sections)

PACIFIC COAST DIVISION

(Arizona, California, Hawaii, Nevada, Philippine Islands)

Pacific Coast Electrical Association

President, PAUL M. DOWNING, Pacific Gas & Electric Co., San Francisco, Cal.; *Secretary*, SAMUEL H. TAYLOR, Suite 729-730, 447 Sutter Street, San Francisco, Cal.

Arizona Utilities Association

President, M. A. POOLER, Tucson Gas, Electric Light & Power Co., Tucson, Ariz.; *Secretary*, L. C. MCCULLOUGH, 134 South Central Avenue, Phoenix, Ariz.

ROCKY MOUNTAIN DIVISION

(Colorado, New Mexico, Wyoming)

President, CLARE N. STANNARD, Public Service Co. of Colorado, Denver, Colo.; *Secretary*, O. A. WELLER, Public Service Co. of Colorado, Denver, Colo.

The Colorado Utilities Association

President, V. L. BOARD, Public Service Co. of Colo., Denver, Colo.; *Secretary*, O. A. WELLER, Public Service Co. of Colo., Denver, Colo.

New Mexico Utilities Association

President, W. W. NIELSEN, New Mexico Power Co., Santa Fe, N. M.; *Secretary-Treasurer*, BERNARD L. WILES, Albuquerque Gas & Electric Co., Albuquerque, N. M.

Wyoming Utilities Association

President, W. D. JOHNSTONE, Mountain States Power Co., Casper, Wyo.; *Secretary*, F. A. PROBST, Mountain States Telephone & Telegraph Co., Casper, Wyo.

SOUTHEASTERN DIVISION

(Alabama, Cuba, Florida, Georgia, North Carolina, South Carolina, Tennessee, Porto Rico)

President, C. A. COLLIER, Georgia Power Co., Atlanta, Ga.; *Secretary*, C. M. KILIAN, 207-8 Bona Allen Bldg., Atlanta, Ga.

SOUTHWESTERN DIVISION

(Arkansas, Louisiana, Mississippi, Oklahoma, Texas)

President, J. G. HOLTZCLAW, Gulf States Utilities Co., Beaumont, Tex.; *Secretary*, S. J. BALLINGER, San Antonio Public Service Co., San Antonio, Tex.

Arkansas Utilities Association

President, W. E. BANN, Southwestern Gas & Electric Co., Texarkana, Tex.; *Secretary*, R. I. BROWN, Arkansas Central Power Co., Little Rock, Ark.

Mississippi Electric League

President, A. H. JONES, Jones-Johnson Co., McComb, Miss.; *Secretary*, A. R. RIDDICK, A. G. Riddick, Inc., Jackson, Miss.

Oklahoma Utilities Association

President, L. W. SCHERER, United Telephone Corp., Watonga, Okla.; *Secretary*, EDWARD F. MCKAY, 1020 Petroleum Bldg., Oklahoma City, Okla.

Southwestern Public Service Association

President, W. H. BURKE, Stone & Webster, Inc., Houston, Tex.; *Secretary*, E. N. WILLIS, 403 Slaughter Bldg., Dallas, Tex.

***Note: This Division is in Process of Formation.**

SECTIONS, BUREAUS AND COMMITTEES

Chairmen's names only listed here

SPECIAL NATIONAL COMMITTEES

Advertising Committee—FRANK LEROY BLANCHARD, Henry L. Doherty & Co., New York, N. Y.

Charles A. Coffin Prize Committee—P. S. ARKWRIGHT, Georgia Power Co., Atlanta, Ga.

Codes and Standards Committee—IRVIN W. DAY, The Connecticut Light & Power Co., Waterbury, Conn.

Constitution and By-Laws Committee—R. F. PACK, Northern States Power Co., Minneapolis, Minn.

Electrification of Steam Railroads Committee—BRITTON I. BUDD, Public Service Co. of Northern Illinois, Chicago, Ill.

Exhibition Committee—E. W. GOLDSCHMIDT, Wagner Electric Corp., New York, N. Y.

Finance Committee—SIDNEY Z. MITCHELL, Electric Bond & Share Co., New York, N. Y.

Lamp Committee—FRANK W. SMITH, The United Electric Light & Power Co., New York, N. Y.

Prize Awards Committee—W. H. ONKEN, JR., *Electrical World*, New York, N. Y.

Public Policy Committee—R. H. BALLARD, Southern California Edison Co., Los Angeles, Cal.

Rate Research Committee—L. R. NASH, Stone & Webster, Inc., Boston, Mass.

Water Power Development Committee—PAUL A. SCHOELLKOPF, The Niagara Falls Power Co., Niagara Falls, N. Y.

Wiring Policy Committee—J. E. DAVIDSON, Nebraska Power Co., Omaha, Neb.

GENERAL NATIONAL COMMITTEES

***Civic Development Committee**—JOHN B. REYNOLDS, Middle West Utilities Co., Chicago, Ill.

***Educational Committee**—FRED R. JENKINS, Commonwealth Edison Co., Chicago, Ill.

***Insurance Committee**—W. H. SAWYER, Allied Power & Light Co., New York, N. Y.

***Membership Committee**—HOWARD K. MOHR, The Philadelphia Electric Co., Philadelphia, Pa.

***Rural Electric Service Committee**—CHARLES F. STUART, Northern States Power Co., Minneapolis, Minn.

ACCOUNTING NATIONAL SECTION

***Section's Executive Committee**—J. F. FORD, The Philadelphia Electric Co., Philadelphia, Pa.

***Classification of Accounts Committee**—H. C. HASBROUCK, H. C. Hopson & Co., New York, N. Y.

Corporate Finance Committee—O. E. MCCORMICK, Middle West Utilities Co., Chicago, Ill.

***Customers' Records Committee** — DOUGLAS BROWN, New York & Queens Electric Light & Power Co., Long Island City, N. Y.

***Fixed Capital Committee**—J. A. ROCKWOOD, Portland Electric Power Co., Portland, Ore.

***General Records Committee**—K. B. CRUMB, American Gas & Electric Co., New York, N. Y.

***Purchasing and Storeroom Committee**—W. G. YOUNG, New York & Queens Electric Light & Power Co., Long Island City, N. Y.

***Statistics Committee**—HARRY A. SNOW, The Detroit Edison Co., Detroit, Mich.

COMMERCIAL NATIONAL SECTION

***Section's Executive Committee**—MARSHALL E. SAMPSELL, Central Illinois Public Service Co., Chicago, Ill.

***Commercial and Industrial Power and Heating Bureau**—V. M. F. TALLMAN, Charles H. Tenney & Co., Boston, Mass.

Commercial Cooking Committee—O. WILHELMY, The Union Gas & Electric Co., Cincinnati, Ohio.

Electric Truck Committee — GUY W. FALLER, Public Service Co. of Colorado, Denver, Colo.

Central Power Committee—H. C. THUERK, Erie Lighting Co., Erie, Pa.

Industrial Heating Committee—J. L. FADEN, The Edison Electric Illuminating Co., Boston, Mass.

***Lighting Bureau**—T. O. KENNEDY, The Ohio Public Service Co., Cleveland, Ohio.

Commercial and Industrial Lighting Committee—J. DANIELS, The Edison Electric Illuminating Co., Boston, Mass.

Electrical Advertising Committee—C. J. EATON, Middle West Utilities Co., Chicago, Ill.

Home Lighting Committee—W. T. BLACKWELL, Public Service Electric & Gas Co., Newark, N. J.

Street Lighting Committee—R. J. MALCOMSON, Public Service Co. of Northern Illinois, Chicago, Ill.

***Merchandising Bureau**—FRANK D. PEMBLETON, Public Service Electric & Gas Co., Newark, N. J.

Domestic Electric Range Committee—F. A. COUPAL, Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.

Merchandise Sales Committee—C. L. HAROLD, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

Refrigeration Committee—C. L. DUNN, The Ohio Public Service Co., Cleveland, Ohio.

Water Heating Committee—NORMAN T. WILCOX, Stone & Webster, Inc., Boston, Mass.

***Customer Relations Committee**—H. T. EAST, Public Service Co. of Northern Illinois, Chicago, Ill.

Promotional Rates Committee—E. W. LLOYD, Commonwealth Edison Co., Chicago, Ill.

***Wiring Sales Committee**—A. P. GOOD, Commonwealth Edison Co., Chicago, Ill.

ENGINEERING NATIONAL SECTION

***Section's Executive Committee**—E. C. STONE, Duquesne Light Co., Pittsburgh, Pa.

***Accident Prevention Committee**—C. R. BEARDSLEY, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

***Electrical Apparatus Committee**—J. A. JOHNSON, The Niagara Falls Power Co., Niagara Falls, N. Y.

Engineering Administration Committee—H. P. LIVERSIDGE, The Philadelphia Electric Co., Philadelphia, Pa.

***Hydraulic Power Committee**—BYRON E. WHITE, Utica Gas & Electric Co., Utica, N. Y.

***Inductive Coordination Committee**—H. L. WILLS, Georgia Power Co., Atlanta, Ga.

***Meter Committee**—E. E. HILL, The New York Edison Co., New York, N. Y.

***Overhead Systems Committee**—HAROLD COLE, The Detroit Edison Co., Detroit, Mich.

***Power System Engineering Committee**—L. W. W. MORROW, *Electrical World*, New York, N. Y.

***Prime Movers Committee**—E. B. RICKETTS, The New York Edison Co., New York, N. Y.

Special Engineering Research Committee—C. F. HIRSHFELD, The Detroit Edison Co, Detroit, Mich.

***Underground Systems Committee**—J. W. SYLVESTER, The Philadelphia Electric Co., Philadelphia, Pa.

PUBLIC RELATIONS NATIONAL SECTION

***Section's Executive Committee**—J. F. Owens, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

***Cooperation with Educational Institutions**—Carl D. Jackson, 36 West 44th Street, New York, N. Y.

***Customer Ownership**—W. H. Hodge, Byllesby Engineering & Management Corp., Chicago, Ill.

***Industrial Relations Committee**—Homer E. Niesz, Commonwealth Edison Co., Chicago, Ill.

***Information Bureau Organizations Committee**—T. A. Kenney, Allied Power & Light Corp., New York, N. Y.

Manufacturers' Advertising Committee—T. J. McManis, General Electric Co., Schenectady, N. Y.

***Public Speaking Committee**—W. S. Vivian, Middle West Utilities Co., Chicago, Ill.

***Relations with Financial Institutions Committee**—A. W. Robertson, Westinghouse Electric & Manufacturing Co., New York, N. Y.

***Women's Committee**—Miss Sophia Malicki, Middle West Utilities Co., Chicago, Ill.

***Provision is made for a representative from each Geographic Division.**

CONVENTIONS AND MEETINGS

Meeting of the Section, Bureaus and Committees of the National Electric Light Association are shown in roman type; those of other associations in italics

1929

February

1 *American Institute of Electrical Engineers, New York, N. Y.*

4 Women's Committee, Eastern Geographic Division, 10:00 a. m., N. E. L. A. Headquarters, New York, N. Y

5–6 Merchandising Bureau, Book-Cadillac Hotel, Detroit, Mich.

5–7 *Artistic Lighting Equipment Association, Cavalier Hotel, Virginia Beach, Va.*

6 *New York Electrical Society, New York, N. Y.*

6 Draft Tubes Subcommittee, Hydraulic Power Committee, N. E. L. A. Headquarters, New York, N. Y.

6–8 *Iowa Engineering Society, Des Moines, Iowa.*

7 Commercial Section, Eastern Geographic Division, Pittsburgh, Pa.

12–16 *Midwest Power Conference and Exhibition, Chicago, Ill.*

13–14 Accounting, Commercial, Engineering and Public Relations Sections, Southeastern Geographic Division, Jacksonville, Fla.

18–20 New Mexico Utilities Association, Franciscan Hotel, Albuquerque, N. M.

18–21 *American Institute of Mining and Metallurgical Engineers, New York, N. Y.*

20–27 *Own Your Home Exposition, Madison Square Garden, New York, N. Y.*

25–26 Commercial Section, North Central Geographic Division, Nicollet Hotel, Minneapolis, Minn.

25–26 Classification of Accounts Committee, Palmer House, Chicago, Ill.

25–26 Customers' Records Committee, Palmer House, Chicago, Ill.

25–26 Fixed Capital Committee, Palmer House, Chicago, Ill.

25–26 General Records Committee, Palmer House, Chicago, Ill.

25–26—Purchasing and Storeroom Committee, Palmer House, Chicago, Ill.

25–26 Statistics Committee, Palmer House, Chicago, Ill.

25–26 Corporate Finance Committee, Palmer House, Chicago, Ill.

25–26 Budget Committee, Palmer House, Chicago, Ill.

25 General Meeting and Luncheon, 12:30 p. m., Palmer House, Chicago, Ill.

26 Executive Committee, Accounting National Section, 2:00 p. m., Palmer House, Chicago, Ill.

26–27 Iowa Section, N.E.L.A., Operators Division, Sioux City, Iowa.

March

4–6 *American Railway Association, Division 4, Engineering Signal Section, Stevens Hotel, Chicago, Ill.*

5 Insurance Committee, N. E. L. A. Headquarters, 10:00 a. m., New York, N. Y.

6 Executive Committee, Public Relations National Section, 10:30 a. m., N. E. L. A. Headquarters, New York, N. Y.

6 *New York Electrical Society, New York, N. Y.*

7 National Executive Committee, 10:30 a. m., N. E. L. A. Headquarters, New York, N. Y.

8 *Board of Directors, Society for Electrical Development, New York, N. Y.*

11–12 Hydraulic Power Committee, Peabody Hotel, Memphis, Tenn.

11–12 Overhead Systems Committee, Peabody Hotel, Memphis, Tenn.

11–12 Power Systems Engineering Committee, Peabody Hotel, Memphis, Tenn.

11–12 Prime Movers Committee, Peabody Hotel, Memphis, Tenn.

12 Executive Commitee, Engineering National Section, Peabody Hotel, Memphis, Tenn.

12–13 Accident Prevention Committee, Peabody Hotel, Memphis, Tenn.

12–14 Oklahoma Utilities Association, Oklahoma City, Okla.

13–14 Electrical Apparatus Committee, Peabody Hotel, Memphis, Tenn.

13–14 Inductive Coordination Committee, Peabody Hotel, Memphis, Tenn.

13–14 Meter Committee, Peabody Hotel, Memphis, Tenn.

13–14—Underground Systems Committee, Peabody Hotel, Memphis, Tenn.

20–22 *American Institute of Electrical Engineers, Regional Meeting, Cincinnati, Ohio.*

20–22 Commercial National Section, Group Committee meetings, Edgewater Beach Hotel, Chicago, Ill.

21–23 *American Society of Mechanical Engineers, Knoxville, Tenn.*

April

3 *New York Electrical Society, New York, N. Y.*

4–13 *Home Complete Exposition, Indiana State Fair Grounds, Indianapolis, Ind.*

17–18 *National Warm Air Heating and Ventilating Association, Indianapolis, Ind.*

21–23 *American Society of Civil Engineers, Dallas, Texas.*

22–26 *American Welding Society, Engineering Societies Bldg., New York, N. Y.*

24–26 Middle West Geographic Division, Hotel Fontenelle, Omaha, Neb.

29–30 *Chamber of Commerce of the U. S. A., Washington, D. C.*

30 Southwestern Geographic Division, Hot Springs, Ark.

30 Arkansas Utilities Association, Hot Springs, Ark.

May

1–3—Southwestern Geographic Division, Hot Springs, Ark.

1–3 Arkansas Utilities Association, Hot Springs, Ark.

1–3 *Chamber of Commerce of the U. S. A., Washington, D. C.*

1–3 *Indiana Public Utilities Association, Hotel Gary, Gary, Ind.*

1–3 Indiana Electric Light Association, Hotel Gary, Gary, Ind.

1–3 *Indiana Gas Association, Hotel Gary, Gary, Ind.*

7–9 *American Institute of Electrical Engineers, Regional Meeting, Dallas, Texas.*

7–10 East Central Geographic Division, Brown Hotel, Louisville, Ky.

8–10 Southeastern Geographic Division, Asheville, N. C.

13–15 *American Society of Mechanical Engineers, Rochester, N. Y.*

13–16 *National Fire Protection Association, Memphis, Tenn.*

20–25 *National Electrical Manufacturers Association, The Homestead, Hot Springs, Va.*

27–31 *National Electrical Wholesalers Association, The Homestead, Hot Springs, Va.*

27–31 *General Federation of Women's Clubs, Swampscott, Mass.*

June

3–7 Annual Convention and Exhibition, NATIONAL ELECTRIC LIGHT ASSOCIATION, Municipal Auditorium, Atlantic City, N. J.

14 *Board of Directors, Society for Electrical Development, New York, N. Y.*

16–18 North Central Geographic Division, Breezy Point Summer Resort, Pequot, Minn.

18–21 *Society of Automotive Engineers, New York, N. Y.*

19–21 Canadian Geographic Division, Algonquin Hotel, St. Andrews-by-the-Sea, N. B.

19–22 Pacific Coast Geographic Division, Del Monte, Cal.

24–28 *American Society for Testing Material, Atlantic City, N. J.*

24–28 *American Institute of Electrical Engineers, Swampscott, Mass.*

26–29 Northwest Geographic Division, Seattle, Wash.

July

1–4 *American Society of Mechanical Engineers, Salt Lake City, Utah*

August

27–30 *National Association of Railroad and Utilities Commissioners, Glacier National Park Hotel, Glacier National Park, Mont.*

September

4–6 Pennsylvania Electric Association, Bedford Springs Hotel, Bedford Springs, Pa.

9–11 Rocky Mountain Geographic Division, Hotel Colorado, Glenwood Springs, Colo.

16–19 New England Geographic Division, Hotel Griswold, New London, Conn.

19–20 Empire State Gas and Electric Association, Saranac Inn, Saranac Lake, N. Y.

28–30 *American Electric Railway Association Convention and Exhibit, Atlantic City Auditorium, Atlantic City, N. J.*

30 *National Safety Council, Stevens Hotel, Chicago, Ill.*

October

1–4 *American Electric Railway Association Convention and Exhibit, Atlantic City Auditorium, Atlantic City, N. J.*

1–4 *National Safety Council, Stevens Hotel, Chicago, Ill.*

14–18 *American Gas Association, Atlantic City, N. J.*

NEW MEMBERS

Employees of Electric Light & Power Companies (Class B)

California, Riverside, The Southern Sierras Power Company
A. J. Scott

Colorado, Denver, Rocky Mountain Committee on Public Utility Information
George E. Lewis

Connecticut, Waterbury, Connecticut Light & Power Company
Miss Bessie M. Harris (Middletown, Conn.)

Georgia, Atlanta, Georgia Power Company
Phillip Peeples

Georgia, Atlanta, Utilities Information Committee of Georgia
Willard Cope

Iowa, Des Moines, Iowa Committee on Public Utility Information
Joe Carmichel

Massachusetts, Boston, The Edison Electric Illuminating Company of Boston
Henry B. Kane
Gaston E. Loubris (Wakefield, Mass.)

Massachusetts, Boston, New England Bureau of Public Service Information
Samuel T. MacQuarrie

New Jersey, Asbury Park, Jersey Central Power & Light Company
John G. Haulenbeek (Belmar, N. J.)

New York, Bronx, The Bronx Gas and Electric Company
Henry Allen Rosenquest

New York, New York, American Gas & Electric Company
Henry D. Freitag

New York, New York, Electric Bond and Share Company
K. C. Christiansen (Germantown, Sta., Philadelphia, Pa.)

New York, New York, The New York Edison Company
William J. Brown
John P. Donlon
James P. Geoghegan
Diedrich Heins
Louis Inman
Nelson Inman
Alfred T. Jetter (Long Island City)
Frederick Edison Mollmann (Valley Stream, L. I.)
Joseph A. Perretti (Brooklyn, N. Y.)
Edward Stanley Phelps (Rockville Centre)
Joseph E. A. Rose
E. A. Sauer
William J. Sullivan (Richmond Hill)
New York, Long Island City, New York & Queens Electric Light & Power Company
Elmer H. Braun (Flushing, N. Y.)
New York, Staten Island, St. George, Staten Island Edison Corporation
Frank D. Banghart (West New Brighton, Staten Island, N. Y.)
Oklahoma, Sand Springs, Oklahoma Power & Water Company
Samuel Edwin Wolff
Pennsylvania, Pittsburgh, West Penn Power Company
Michael D. Baker (Springdale, Penn.)
Virginia, Winchester, Northern Virginia Power Company
Miss Mary E. Carr (Hancock, Maryland)
Canada, Nova Scotia, Halifax, Nova Scotia Light & Power Company, Ltd.
J. J. Doolan, Esq.
Canada, Ontario, Ottawa, Gatineau Power Company
R. J. Brearley, Esq.

Manufacturers (Class D)
Illinois, Chicago, Minerallac Electric Company
New York, Johnson City, Central Flatiron Manufacturing Company
West Virginia, Kenova, Champion Switch Company

Employees of Manufacturing Companies (Class E)
Illinois, Chicago, Federal Electric Company
George Walter Spahr
Illinois, Chicago, Minerallac Electric Company
Arthur J. Ferguson
A. L. Johnson
Pennsylvania, Philadelphia, Hall Electric Heating Company, Inc.
F. V. Magalhaes

Associated Companies (Class F)
Ohio, Kent, The Davey Tree Expert Company

Employees of Associate Companies (Class G)
New York, New York, Ford, Bacon & Davis, Incorporated
Charles F. Uebelacker
Ohio, Kent, The Davey Tree Expert Company
Harry Hyatt
H. W. Withington (New York, N. Y.)

Foreign Members (Class H)
England, London, Wall, London E. C. 2, Dr. H. F. Parshall
South Australia, Adelaide, Mechanical Supplies, Limited.

Reviews of Publications

(*Continued from page* 117)

table of depths of setting), back filling and tamping, pole setting and erection, crossarms, insulators, guys, anchors, conductors (with table of minimum sizes), conductor configuration, sags (with tables), conductor fastenings, lightning arresters, grounding, transformer installations and economical use and spacing of transformers (with charts and illustrative problems). These construction features state in general the minimum clearance and strength requirements that should be employed in the construction of rural lines and are based on the requirements contained in Part 2 of the revised National Electrical Safety Code.

Charts and problems are given dealing with the economical use and location of transformers. In preparing the charts and problems for this part of the report, consideration has been given to: Return and fixed charges on the investment, Transformer core losses, Primary and secondary copper losses, Estimated kilowatt hour consumption, and Voltage regulation.

The sag tables apply to hard and medium drawn bare copper in sizes from No. 8 to No. 2/0 and are given for heavy, medium and light loading districts as defined in the National Electrical Safety Code for spans of from 100 to 500 feet. Sag tables are also included for aluminum cable steel reinforced (ACSR) for sizes from No. 8 to No. 4/0 for heavy, medium and light loading districts and for spans of from 100 to 800 feet.

Crossing clearances are illustrated for various conditions encountered in the ordinary run of rural line construction.

This report is well illustrated and should be valuable to anyone having or contemplating construction of rural lines or extensions.—V. W. PALEN.

Low Tension Metering Installations. Serial Report, Meter Committee, Engineering National Section. N.E.L.A. publication No. 289-39; 4 pp. Price 15 cents; to members, 10 cents.

THIS report presents the modern trend of low tension metering installation practice. Various schemes are discussed, and their advantages and disadvantages are pointed out. Of particular interest are the suggested specifications for service-entrance meter cabinets.—E. K.

Progress in Generator Design and Practice. Serial Report, Prime Movers Committee, Engineering National Section. N.E.L.A. publication No. 289-37; 24 pp.; 38 illustrations. Price 45 cents; to members, 30 cents.

DURING the last few years, due largely to revolutionary advances in the art of steel welding and cutting by flame and arc, great changes have occurred in the mechanical construction of electric generators.

Concurrently, the demand for generators of greater capacity, due largely to the advancing practice of system interconnection and the requirement for higher quality and longer life, has resulted in the development of new practices in the electrical design, construction and application of generators.

This report is a concise, comprehensive digest of the present state and trend of the art, and is presented in the form of statements by four of the larger manufacturers.—E. K.

Power Station Chemistry. Serial Report, Prime Movers Committee, Engineering National Section. N.E.L.A. publication No. 289-28; 20 pp.; 9 illustrations. Price 40 cents; to members, 25 cents.

THIS, the initial report of the Chemists Subcommittee of the Prime Movers Committee, includes extensive bibliographies both on combustion chemistry and corrosion; a preliminary study of the fundamentals of lubrication chemistry, and a tentative standard method for quantitatively determining dissolved oxygen in boiler feed water supplies, raw water excepted.

The report on lubrication presents an initial laboratory study on the chemistry of turbine oil. The program aims to supply to the user answers to the following questions:

1. By what standard can oils be judged suitable for turbine use?

2. If turbine oils deteriorate during use, by what methods can the degree of deterioration be determined?

It is suggested that the basis for judgment of an oil is a chemical one, and test data are cited showing that the criterion for determining the condition of an oil in service should include weekly tests for sludge, water, emulsion and neutralization number, and plotting this data in order to observe the trend of the curves. The change in chemical characteristics of the oil is apparently arrested if definite volumes of new oil, approximately 0.6 per cent by volume, are added at regular intervals. A bibliography and abstracts are included.

A tentative method for determining dissolved oxygen in boiler feed water is given with definite sampling instructions, methods for preparing the necessary solutions, and test procedure. The method may be applied both in the power plant and the laboratory.—E. K.

Industrial Explorers. By Maurice Holland, Director, Division of Engineering and Industrial Research, National Research Council, in collaboration with Henry F. Pringle. Harper & Brothers. Price $3.00.

MR. HOLLAND, in his "Industrial Explorers" has written the story of some of the more prominent of the men engaged in scientific research who, in our age, have had a large part in transmuting scientific knowledge into improved ways of living. It is a series of vastly entertaining word pictures of simple, sincere men, all Americans by birth or adoption, who have devoted themselves to the solving some of the more practical scientific problems.

Written in all cases, upon the basis of direct interviews, and in many instances, from the viewpoint of years of personal friendship, these stories tell not only their problems and how these scientists went about solving them, but paint lifelike pictures of the scientists themselves, their manners, virtues and idiosyncrasies and contain brief histories of their lives. The book contains sketches of Willis R. Whitney and the General Electric Research Laboratories; Frank B. Jewett and transatlantic telephony; Elmer A. Sperry and his new searchlight "Brighter than the sun"; Leo H. Baekeland and "bakelite"; Arthur D. Little and his laboratory; William H. Bassett and copper; C. E. Skinner of the Westinghouse Electric and Manufacturing Co., and more than a dozen others.

These are simple stories, simply told, of great yet simple men.—E. A. SCOTT.

The Busy Man's Guide to This Issue

Electricity: Index of National Prosperity
Wm. Morgan Carpenter 133
The general principles underlying the formation of an electrical index of industry and trade, as a national indicator of business conditions, based upon the total output of electricity. Such an index should prove of value in measuring prosperity.

Amplifier Considers "Kultur"................*Amplifier* 137
The "Kultur," a much misunderstood and abused word, which Amplifier considers, has nothing to do with the struggle for world power. The Industry's contribution to "Kultur" is seen as the sum total of the progress, achievement and efficiency of our economic life and the advancement in social, scientific and artistic life that may be attributed to electrical development.

Some Representative Research Organizations
Philip S. Siff 141
A number of the larger industrial research organizations are pictured in sufficient detail to present an impression of the thorough going way in which efforts are being made to add to and apply to practical use, the discoveries made in scientific investigation.

Association Is Planning for Greatest Convention........ 146
Indicates a number of factors that will contribute to making the forthcoming N.E.L.A. Convention the most outstanding in its history.

The Accountant's Place in the March of Progress
L. W. Clark 147
Whether or not the gigantic business organizations of tomorrow are going to justify their existence will depend, the author writes, to a considerable extent on the ability of the accountant to meet the situation. The information which the accountant is able to furnish is of vital importance to managerial policies. Practical suggestions on how to increase the accountant's usefulness are offered.

Electric Heat: An Economic Paradox......*B. S. Havens* 154
Electric Heat should be considered a tool in industry much as is the hammer, saw, drill, etc., and as such should be analyzed and its merits weighed. Aside from its obvious advantages in many operations, electric heat is frequently found to be cheaper from a standpoint of overall cost than any other form of energy.

Design of High Voltage Outdoor Substations
L. M. Smith 153
The last of a series of six discussions on the design of outdoor substations. The substations of the Alabama Power Company are discussed in this installment. The cost of high tension substations of a far flung transmission is an appreciable figure in the overall cost to serve. Every economy that can be effected by careful engineering has to be made use of if many extensions are to be justified.

Records That Speed Up Service..............*H. T. East* 159
Systems used by various companies to facilitate prompt servicing of customers. San Antonio Power Company system explained in detail.

The Cost of Electric Service to Farmers
Charles F. Stuart 172
At a rural electric service conference held at Minneapolis, Minn., a number of speakers developed some extraordinary facts intimately related to the question "How much will it cost?" being asked by thousands of farmers throughout the country. Not only was much evidence offered at this conference that electricity could be made to pay its own way on at least many farms, but there were other speakers who offered much definite information as to how a company can organize a Rural Electric Service Department and how that department can aid and guide the farmer in intelligent use of the service.

Member Companies of N. E. L. A.................... 182
List of associate and foreign member companies of the Association.

Departments

Service Suggestions.................................. 159
See "Records to Speed Up Service" noted above.

Interpretations of Electrical Development

Monthly National Statistics of the Electric Light and Power Industries.................. 162
Operating statistics for the month of November, 1928.

Percentage of Farms with Electric Service.................. 162
The first of a series of estimates of number of farms served by the electrical industry by States.

Developed Water Power in the United States.................. 163
Table, with comments, of water power developments in the United States for year 1928, shown by Geographic Sections and by States.

An Evaluation of "1928 Prosperity".................. 164
Output of electricity showed only normal increase in demand. Indication of general level of prosperity. Percentage of increase in production in geographic sections.

Engineering Section

Electrical Apparatus Committee Meeting.................. 165
Resume of topics discussed at Cleveland meeting, January 9-10. Reported by E. E. George.

Reliable Time Delay Under Voltage Devices Now Available........ 166
These devices have passed through experimental stage and are now in regular production. It is hoped manufacturers will educate industrial users as to the merits of this device and encourage general adoption.

Prime Movers Committee Meeting.................. 167
Resume of topics discussed at Pittsburgh meeting, February 4-5. Reported by Edward B. Ricketts.

Progress of Joint Study of Telephone Protection.................. 168
The relation which telephone protection bears to the problems associated with inductive and safety coordination is under active study by the Development and Research Subcommittee of the Joint General Committee of the N.E.L.A. and the Bell System. The more important investigations in which the Development and Research Committee is now actively engaged are discussed, with outline of what may be expected from the work of this committee.

Group Meeting of Engineering Section, New England Division..... 168
Resume of topics discussed at Boston Meeting, February 13-14. Reported by F. G. Harriman.

North Central Engineering Meeting.................. 169
Resume of topics discussed at Minneapolis, Minn., January 21-22.

Commercial Section

Merchandising Bureau Meets at Detroit.................. 170
Resume of topics discussed at Detroit Meeting, February 5-6.

Pacific Coast Commercial Meeting.................. 170
Resume of topics discussed at Los Angeles, February 17-18. Reported by Cristel Hastings.

Accounting Section

Group Meeting Accounting National Section.................. 171
Resume of topics discussed at Chicago Meeting, February 25-26.

Rural Electrification

The Cost of Electric Service to Farmers.................. 172
(Discussed above under "The Cost of Electric Service to Farmers.")

Geographic Divisions and State Associations

News Letter from East Central Division.................. 174
News from this Division reported by D. L. Gaskill.

Conference on Employee Education, Southwestern Division......... 175
Resume of conference of executives and representatives held at Dallas, Texas, January 25.

Women's Committee

News Letter.................. 175
Brief paragraphs on Women's Committee activities throughout the country.

Electrical News Items.................................. 177
Articles from *Electrical News Items*, weekly news release of the N.E.L.A.

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THE PRESIDENT'S PAGE

Competition

> Public Utilities in the United States are regulated monopolies, and are also protected industries. The federal courts have laid down the rule that they are entitled to 8 per cent on their investment in property. Accordingly, if they elected, the utilities could exact very high rates from household users and make no efforts to get additional business through stimulating industry. Enlightened self-interest, however, encourages them to build up the communities which they serve, thus getting the benefits of quantity busines and a steady load factor. *Though the utilities have a virtual monopoly in supplying householders, they are in active competition in serving industry. They must not only compete with steam plants and with oil, but also compete with the alternative under which large industrial concerns can generate their own electricity.*—M. S. RUKEYSER in the *Nation.*

THERE are no trade secrets in the electrical industry. Every new development that improves efficiency in the manufacture of our product is promptly made available to the world at large. The manufacturer who generates his own electricity is free to draw upon the experience of engineers who have given and are giving life-long service to the improvement of the service of electricity supply. The municipal plant is equally welcome to the fruits of research and pioneering made possible by both the co-operative spirit and the individual initiative of the privately operated utilities.

Yet, the percentage of power produced locally by industrial plants steadily decreases, while that procured by them from the electric light and power companies moves upward at a rapid rate.

One of the reasons for this, outside of the manifest superiorities of electrical energy for power purposes, is that we "stick to our knitting."

The production and distribution of power—in electrical form—is the prime business of the electric light and power industry. It is the art to which its whole efforts are devoted; it is not collateral to some other business. This is true of no other basic industry. Factories, mines, railroads, all others, are users of power and they may produce power, but their essential object is the production of other goods or services; power to them is important but incidental.

PSArkwright

President.

N·E·L·A· BULLETIN

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NATIONAL ELECTRIC LIGHT ASSOCIATION

A Voluntary Organization of Companies Engaged In, and Individuals Affiliated With, or Interested In, the Electric Light and Power Industry: "Organized to Advance the Art and Science of the Production, Distribution and Use of Electrical Energy for Light, Heat and Power for Public Service."

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Lexington	3310	Fred W. Herbert
Lexington	5059	C. E. Greenwood
Lexington	3311	E. H. Greenwood
Lexington	5035	J. O'R. Coleman and Engineering Department

THE distrust of pure science among the practical is vanishing, principally because pure science has rewarded the practical ones in such concrete fashion.—*New York Sun.*

Some victories lead to an impasse, some defeats open up new avenues.—*Leon Trotsky.*

Convention

IT is not too early to make plans for attending the 1929 Convention. Full transportation and hotel information with reservation blanks will be mailed out shortly from N. E. L. A. Headquarters to all members. While there is not anticipated a shortage of hotel accommodations for Convention delegates, it is certain that the choicer quarters will not be sufficient to supply all demands.

The best hotel accommodations naturally will be given to the early applicants. Memorial Day will come in the weekend preceding the Convention and draw thousands to Atlantic City for a short vacation. This is an added reason for making reservations promptly.

Prizes

ON Page 149 appears a final notice of the N. E. L. A. Prize Awards for 1929. Not many days remain to get competing papers to the Secretary of the Association.

The senior prize, the Doherty Medal, is for the best paper on any subject relating to the Electric Light and Power Industry. There are other prizes totaling nearly $2,000 for the specialized fields of Accounting, Commercial, Engineering and Public Relations.

Certainly here is an excellent opportunity to capitalize in both money and distinction knowledge of the electrical industry.

Conservation

THE improvements in production efficiency of centralized, large-unit, fuel burning plants since 1919 has resulted in a saving of the national supply of coal that is nothing short of dramatic in its import. Economies resulting from increased generating efficiency have done much more for the conservation of natural resources than have—for a striking example—all the installed hydro-electric plants in the United States.

In 1919 the average rate of coal consumption was 3.2 pounds per kilowatt-hour. The rate for 1928 was 1.76 per kilowatt hour or half the 1919 rate. If coal had been consumed by electric public utilities at the rate of 3.2 pounds per kilowatt-hour in 1928 the increase in fuel consumption would have been about 38,000,000 tons, valued at about $150,000,000.

It follows, then, as the Statistical Research Department points out elsewhere in this issue, that had fuel use remained at the same efficiency as prevailed in 1919 and the saving in coal had been effected by the installation of water power instead of steam, it would have been necessary to increase the capacity of the hydro-electric plants of the country by about 14,000,000 horse-power—or to approximately twice their present installed capacity.

Reports

IF evidence were required of the ever-increasing role played by the N. E. L. A. in the growth of the electric light and power industry, the sales, in February, of committee reports and proceeding would be sufficient. In that month, sales amounted to $6,228.20. In February, 1928, corresponding sales were $1,453.56.

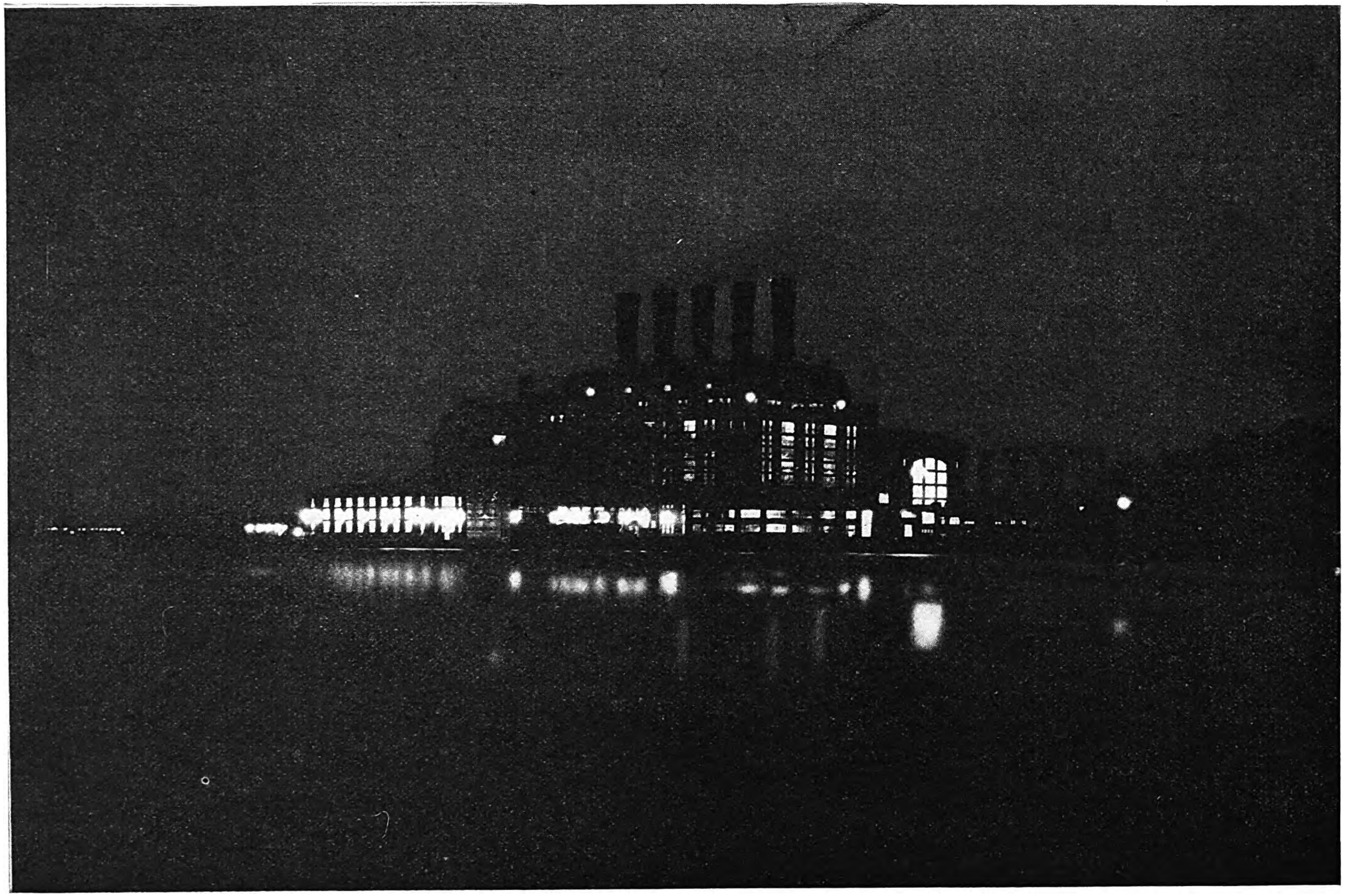
It is interesting to note that 1928 sales of Reports and Proceedings amounted to $28,082.03, whereas only a few years ago they were practically nil.

Bearing in mind the fact that the N. E. L. A. does not publish for a profit and that prices are set at the lowest possible figure which will enable the Association to break even on printing costs only, it is evident that a vast amount of material is represented by the above figures, and that the constructive work of the Association's committees is being widely broadcast and effectively used.

Bulletin

LAST fall it became expedient to find some means for enlarging the capacity of the N. E. L. A. BULLETIN. After a survey of possibilities it was estimated that by a slight increase in the size of pages, the use of three columns of type, and a slight decrease in breadth of margins, the capacity of a 64 page issue could be increased by 35 to 40 per cent, using 10 point type, the same size used in the old format. Actually, more additional printing space than this was needed.

This additional space was gained by using 8 point type for the various departments, with 10 point left for the feature articles. By actual check of the material in the two issues that have appeared in new format between 55 and 60 per cent increase in amount of text has been gained—or more than would have been possible by adding 32 pages to the size of the BULLETIN in the old format.



POWER HOUSES BY NIGHT
The Trenton Channel Plant of the Detroit Edison Company

N·E·L·A·
BULLETIN

March, 1929 Vol. XVI No. 3

Electricity: Index of National Prosperity

By WM. MORGAN CARPENTER

(EDITOR'S NOTE—This article outlines the general principles underlying the formation of an electrical index of industry and trade, as a national indicator of business conditions based upon the total output of electricity by all agencies which contribute to the public supply. It compares such an index recently developed by the Association's Statistical Research Department with other current indicators and expresses the thought that in the course of time this index will be found of great value as an additional means of measuring the "prosperity" of the country. In the present state of the development of electrical service and of the statistical records of such service, this conception of the curve of normal electrical production is advanced by its author on a tentative basis.)

Mr. Carpenter is Research Statistician of the National Electric Light Association

TWO years ago, there was pointed out in the N. E. L. A. BULLETIN[1] the application of a fundamental principle of biological growth to the number of consumers of electric energy. Bearing a direct relationship to population, the increase in the aggregate of wired homes must necessarily follow the same general laws that govern all development in a limited universe. At this time, when at last there are available ten years' detailed figures, the author is prompted to extend his original thesis and to point out, not only the probable application of the biological laws of growth to the entire use (and therefore of production) of electricity, but also to apply these principles to the interpretation of some of the more interesting phenomena of today's business trends.

Similarity of Growth Curves

Careful analyses of the life-histories of the world's various economic developments invariably reveal curves which are always of the same general form. Beginning with a slow start, successful growth is characterized by a steady acceleration as experience improves and new horizons emerge. Then comes a period of large and regular expansion, followed eventually by a tapering off which is at first imperceptible but which develops with increasing severity as potential markets are exhausted, as the possible uses become satisfied, or as the influence of competitors becomes more pronounced. At last the curve becomes parallel to that of population and the industry (or whatever it is) is said to be "saturated." This general philosophy is illustrated by Fig. 1, which shows the second phase of agricultural production (the country's oldest pursuit), the present life-cycle of pig-iron (a long-established industry) and the first phase of the production of electricity (one of the country's newest enterprises), which, as yet, gives no indication of an approaching saturation. Other curves, whose number is limited only by the ambition of the investigator, could be constructed for almost every other line of human endeavor and these in the present year of grace would show various stages of youth, middle age and senescence. Some indeed (as the life-history of the whale-oil lamp or the colonial expansion of Spain) would show a double curve whose descending line into oblivion would be almost the mirror of its ascending branch.

Accepting this general law with some hesitation and with the reservation that only long historical retrospect can give full and proper interpretation to any economic phenomenon, the author here suggests its experimental application to the service of electricity supply and advances some preliminary observations with the thought that eventually an additional and readily computed yardstick of "prosperity" can be evolved.

Curve of Electric Output

Fig. 2, shows a further analysis of the curve of electric output, which

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[1] N.E.L.A. Bulletin, Jan., 1927, vol. XIV, page 11.

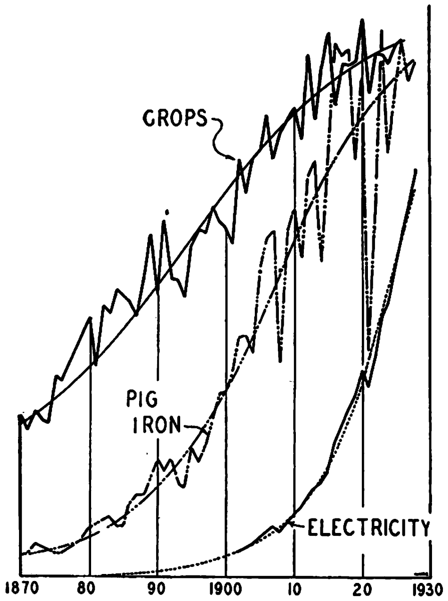


Fig. 1—Typical Production Curves

Suggesting the Application of Pearl's Law of Growth

includes the actual production of electricity by all agencies which contribute, in whole or in part, to the public supply, plus the energy imported from Canada. It rests upon the most reasonable figures calculated from the U. S. Census of Electric Stations (plus those more or less erroneously classified as "electric railways" and so concealed in the U. S. Census of Electric Railways) for 1902, 1907, 1912 and 1917. Since 1919, the total figures are those reported by the United States Geological Survey. Canadian figures comprise those reported since 1919 by the Dominion Bureau of Statistics and, in the earlier years, upon the best estimates available. A smooth curve has been computed, which falls above or below the majority of these points in accordance with the deviation of business above or below "normal," as estimated from the most likely composite of various accepted (though sometimes contradictory) indexes. The relationship between the surplus and deficiency of output with reference to normal is stated in terms of percentages in the saw-tooth line above.

The shape of the curve of normal output strongly suggests one of Pearl's general "logistic" S-type, although the fundamental data afforded by the somewhat confused and overlapping statistics of the earlier years of the industry do not yet permit of the accurate determination of the constants which this type of equation implies. It is, however, a mathematically correct line, whose prolongation into the future is possible. Its form at present approximates a straight line, having departed from the parabola which characterized its earlier stages of growth and not yet having reached the later and eventual stage of tapering off.

The Nation-Wide Diffusion of Electric Service Among All Classes of Consumers

A recent bulletin of the National Industrial Conference Board points out that 73 per cent of all factory machinery is operated by electricity and that nearly two-thirds of this power is procured from the lines of the light and power enterprises. Electricity has thus become the power medium of the nation and the central station plant the point of conversion of fuel and water into the country's major energy supply.

It is significant that all the net increase in the primary power equipment of the United States during recent years has taken place in the power houses of the electrical industry: per contra, the switchboard meters of these power houses have become, in effect,

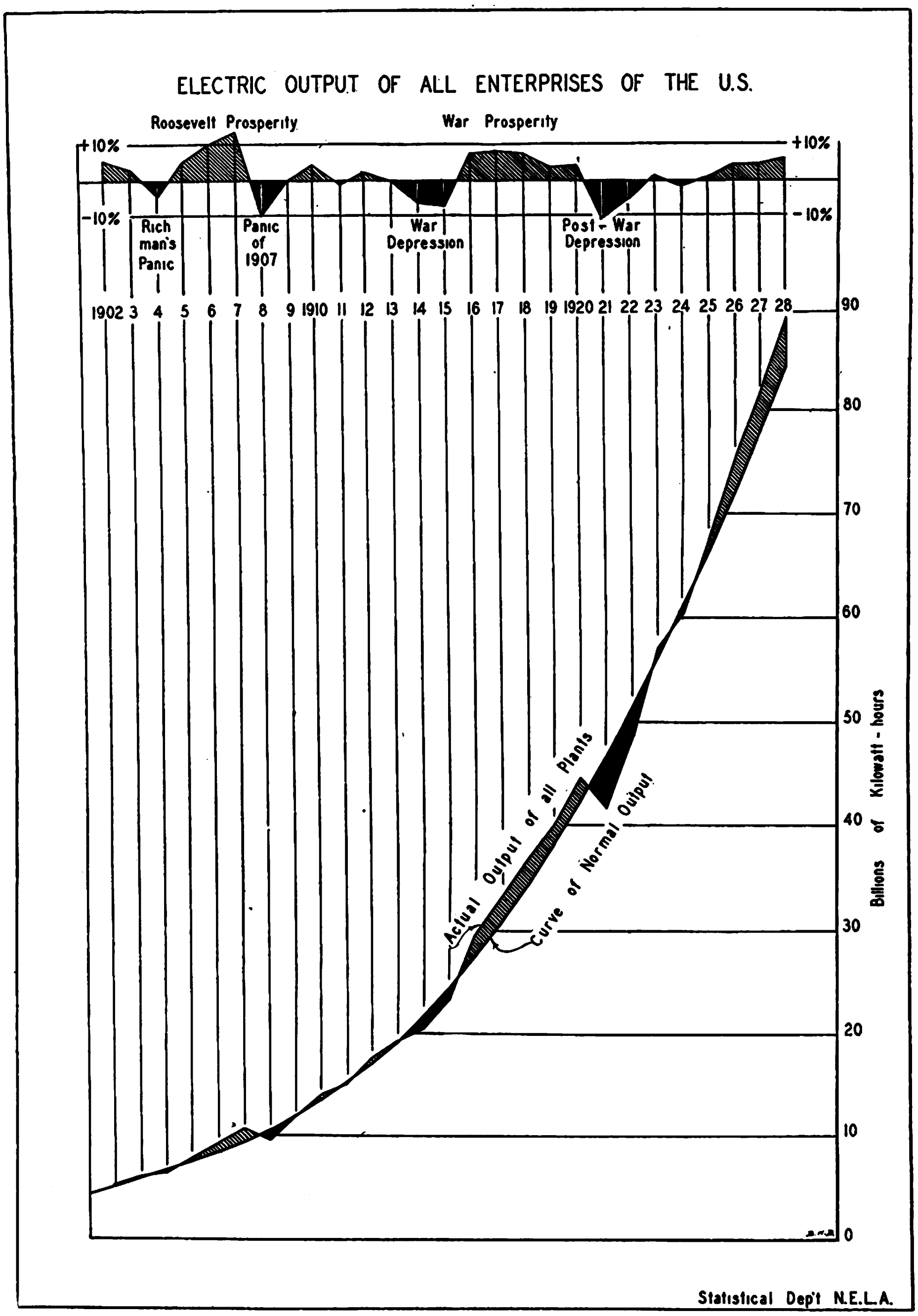


Fig. 2—The Relation Between "Prosperity" and the Output of Electric Energy

("Normal Output" is a smooth curve, with which the "Actual Output" should coincide if industry and trade were exactly "normal." "Actual Output" consists of the net production of electricity by all agencies which contribute, in whole or in part, to the public supply, plus imports from Canada.)

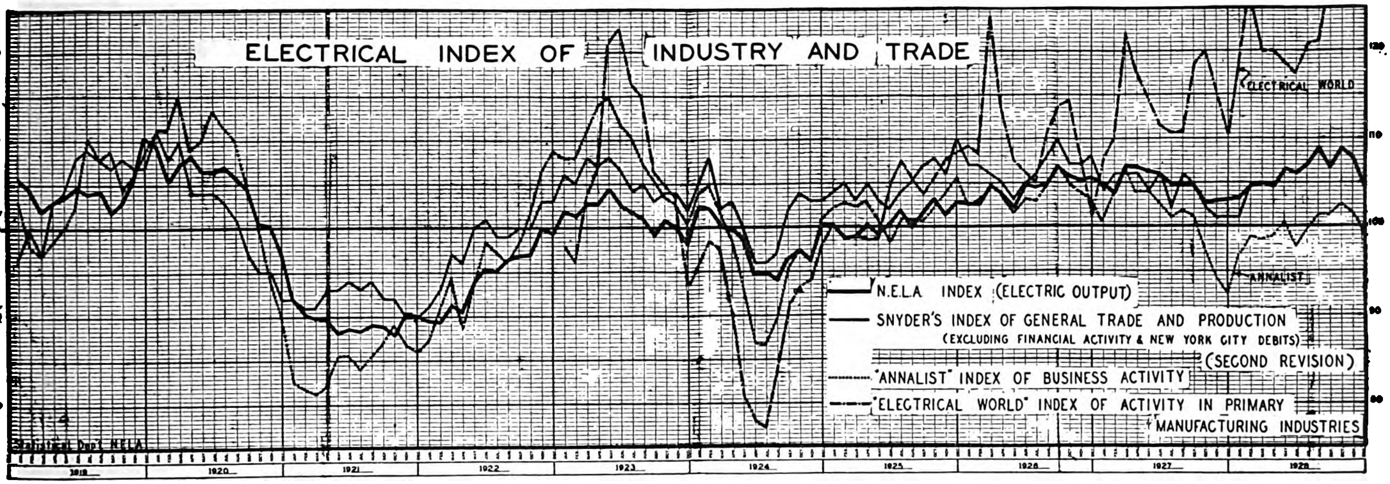


Fig. 3—A Monthly Index of Industry and Trade, Based Upon the Total Output of Electricity

(This constitutes a composite index of the sum total of "prosperity" on the part of the consuming public as well as of the producers of goods throughout the United States, as indicated by the actual total output of electric energy)

the pulses of the operation of the nation's industries to which their wires lead.

Industrial production alone constitutes, however, only a part of the picture of a country's "prosperity." Consuming power is equally (if not more) important, and of this electricity furnishes a similar index. Electric service is now an integral part of the domestic economy of nineteen million households in the United States, and the universal character of this service (extending as it does to 100 per cent of all cities of 5000 population or more, to 97 per cent of all towns with populations between 1000 and 5000, to 50 per cent of all villages with populations between 250 and 1000, to 25 per cent of all hamlets with less than 250 people, as well as its progressive diffusion to the farms of the nation) gives it a geographic distribution of remarkable coverage and accuracy. In addition, there are upwards of two millions of shops, stores, theaters and offices in every city, town and village of the country, whose energy consumption reflects their general prosperity and the state of business in their particular community.

The Use of Energy as an Index of Activity in Industry and Trade

The relative degree to which electricity is used thus becomes a mirror of the country's properity. When business is brisk, factories run more steadily and consume additional power; stores and offices are kept open longer and burn more light; the domestic consumer feels the urge of prosperity and buys and uses additional electrical appliances. When business is slack, the exact opposite takes place. The output of electricity by the public service enterprises of the country thus furnishes a reliable yardstick of the state of business in the nation and the evidence of its industrial activity and social progress.

Some further examination of the inclusion of domestic service among those affected by the fluctuations of "prosperity" appears necessary in view of the pleasant tradition throughout the electric light and power industry that this type of service is immune from the vicissitudes of fortune. It still remains to be proved that the expansion and contraction of the family purse with the earnings of the bread-winner do not extend as far as the meter in the cellar. A certain minimum of light in the home is no doubt necessary, but beyond this there lies the entire question of the relationship of the appliance demand for electricity to "prosperity"—not the prosperity represented solely by business activity, but the far more important phase represented by "a state of mind" which, after all, is still peculiarly sensitive to surrounding circumstances. There are a host of cases where the rise in the purchasing power of a community has shortly been translated into increased kilowatt-hours of domestic use, which phenomenon is often associated with the results either of a fortunate arrangement of the rate schedules or else of increased activity on the part of the commercial department. Conversely, there are others where the results of a calamity or else of a prolonged strike are presently visible in a falling off of domestic appliance demand—a fact to which anybody who has tried to do a merchandising business under such circumstances will probably subscribe.

Construction of Monthly Index

In addition to the regular, normal growth, the production of electricity follows a course of considerable seasonal variation. To some extent, this depends upon the changes in the amount of daylight and temperature. There are also large seasonal swings in the demands of irrigation pumping and still larger ones in the operation of many important industries, such as iron and steel and automobiles, and in the requirements of transportation. This, in a general way, is graphically illustrated by Fig. 4, which shows the output, month by month, by all agencies contributing to the public supply since 1920, as reported by the United States Geological Survey. In addition to this, there is also to be considered the amount imported from Canada, which the chart does not show. While this forms a comparatively small proportion of the grand total, there have been times when some of its increase has been at the expense of power produced in the United States, and vice versa.

When all of the factors of growth and seasonal use are taken into account there remains a figure which represents the amount of electricity which would be needed by the country if business activity were exactly "normal." Any additional output over this amount represents the portion required by the increase in business activity and, conversely, if the total output is less than the normal figure, it represents the portion lost because of business depression. This, in brief, constitutes the basis for the Electrical Index of Industry and Trade,[2] which forms Fig. 3, and with which there are compared other current business indicators. This curve is significant in its conservatism, in its comparative freedom from the wide fluctuations which characterize many of the accepted indexes and in its close correlation with the general average of similar charts. Coming at a time when so many indexes are being prepared by the proponents of this, that and the other thing as the true mirror of business (which charts are often at variance with each other and occasionally contradictory in character) a curve which forms a general average may well be seriously considered.

On the chart there are compared the new Electrical Index, the very conservative curve of Carl Snyder, the *Annalist* index and the *Electrical World's* index of activity in primary manufacturing industries[3]. The correspondence between the new index and Snyder's composite of more than sixty weighted factors is very close.

The comparatively slow changes in the general levels of the electricity curve and the lag behind the others at various critical times suggest that it is influenced not only by production but by variations in the country's purchasing power and by fluctuations in the peoples' standard of living. It suggests an inclusion, not only of the factors entering into the activity of actual manufacture and distribution, but also those more or less intangible ones which are always recognized as existing qualitatively but which other indexes have some difficulty in expressing in terms of actual figures. It might almost seem that further experience over a period of future years may justify the hope that this index represents not only a statistical prosperity—measurable in terms of actual units—but also a composite psychological prosperity.

Will the curve prophesy? No, it will not. There is no way to tell which way the line is going to jump next month. One, and only one, significant fact enables us to make a short-range forecast and that is that all permanent change comes slowly—and the more permanent it is, the slower it comes.

---

[2] This index is constructed as follows: (1) The line of normal annual growth of total electric output has been computed as shown in Fig. 2. (2) This normal annual growth is translated into a normal monthly growth. (3) To each month there is applied a correction for normal seasonal variation, obtained by taking the average of ten years' output for each month and then expressing this as a deviation from the output of each month of the average year of normal monthly growth. These seasonal corrections are:

January ...	105.5%	July	96.7%
February ..	95.6	August	99.5
March	102.4	September .	97.6
April	96.6	October ...	103.8
May	98.1	November .	101.8
June	96.3	December .	105.9

(4) These seasonal corrections are applied to each month derived in (2) and a total obtained which represents the theoretical output in each month if conditions were "normal." (5) The actual output (plus Canadian imports) is compared with this "normal" figure and the deviation expressed in percentages.

These seasonal variations and the resulting index cannot be considered as final. The author has adopted the fundamental principle laid down by Carl Snyder in his description of his first "Index of the Volume of Trade," that for the next few years:

> **"The results here shown are presented simply as first approximations and nothing more. The purpose is to revise the index . . . each year in the light of such new information as may be available as to seasonals, the computation of normal growth . . . and the like."**

[3] Carl Snyder: Index of General Trade and Production (excluding financial activity and N. Y. City debits); 2nd revision; see Journal of American Statistical Association, June, 1928. The *Annalist* index consists of the weighted average of ten items (pig iron, steel ingots, car loadings, electric power, bituminous coal, automobiles, cotton consumption, wool consumption, boots and shoes, zinc) whose deviations from normal have been figured from a computed trend and which deviations have further been corrected for seasonal variation. The *Electrical World's* index is compiled from the monthly consumption of electrical energy by 3626 large manufacturing plants in various industries, scattered throughout the country. It thus shows the use of electricity in primary manufacturing industries, adjusted by the number of working days. It does not appear to be corrected for seasonal variation, nor does it make allowances for the continued growth of the use of electricity at the expense of other forms of energy in these industrial establishments.

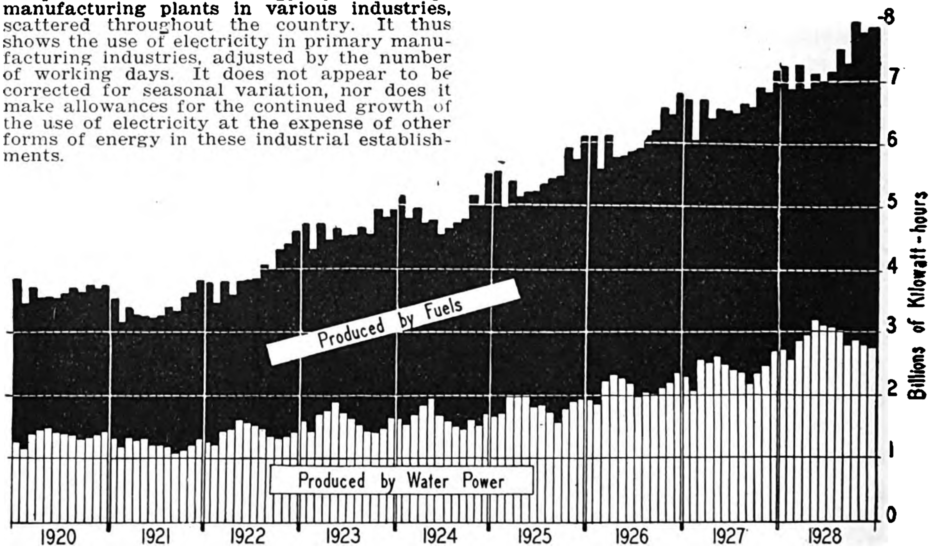


Fig. 4—The Production of Electricity in the United States

(By electric light and power plants, electric railways, public works and certain industrial plants contributing to the public supply. As reported by the United States Geological Survey)

J. E. Zimmermann Heads United Gas Improvement Company

AT the meeting of the Board of Directors of The United Gas Improvement Company held Feb. 27 at Philadelphia, Mr. John E. Zimmermann, Chairman of the Executive Committee, was elected to the office of President. He will continue as Chairman of the Executive Committee.

Mr. Zimmermann, who is fifty-five years old, has been prominent in Philadelphia engineering circles since 1899 when he entered the employ of the American Pulley Company as superintendent of manufacture and later as secretary. After serving with that company for eight years he became associated with Charles Day in the engineering and construction firm of Day & Zimmermann, Incorporated, of which he was president for a number of years. Day & Zimmermann, Incorporated, is a U. G. I. subsidiary. He was elected a member of the Executive Committee of The United Gas Improvement Company on Nov. 14, 1928, and on Dec. 4, 1928, he was chosen chairman of that body.

Although Mr. Zimmermann actively participated in the construction work of Day & Zimmermann, probably his most valuable contribution to the company's success, and the one for which he is best known in the business world, was his work in the reorganization and management of public utilities. This branch of Day & Zimmermann's activities was under his personal direction until a short time ago.

Mr. Zimmermann graduated from the National College of Buenos Aires (1894) and studied engineering at the University of Buenos Aires and University of Pennsylvania, from the latter he received the honorary degree of Master of Science in 1928.

Amplifier Considers "Kultur"

By AMPLIFIER

I WAS talking, not long ago, to an old friend of mine who is the editor of a very great and internationally known monthly. This publication has an editorial policy which 99 educated persons out of 100 would probably describe as a policy of "culture" and place it in that group of periodicals which are presumed to be devoted to "the training, improvement and refinement of mind, morals or taste" (See any standard dictionary).

But while for a period of time including many generations—it has been in existence for scores of years—it may have been devoted to the pursuit of a form of culture within a category covered by such a definition, this magazine seems to have passed out of the rather narrow limits of mere "culture" and into the much broader field of "kultur." Unfortunately, the war has given the word "kultur" an offensive sound to many people. Its use before and during the world struggle seems to have been confused with "Kulturkampf," which in turn is confused with the phrase "struggle for power," used by Bismarck no less than five times in one paragraph in defense of his struggle with the Catholic Church, which he claimed was not the fight "of a Protestant dynasty against the Catholic Church," but "a struggle for power, a struggle as old as the human race, the struggle for power between monarchy and priesthood."

BUT "kultur" has nothing to do with a struggle for power if we are to believe our dictionaries. It simply signifies "progress, achievement and efficiency in all phases, practical or theoretical, of political, economic, social, scientific or artistic life." It is all inclusive and something much more than the Anglicized word "culture," which, through usage, seems to have degenerated into meaning birth, breeding, education and an instinctive knowledge of the right implement and how to use it as the various courses of a formal dinner pass before one.

All of which is only by way of a preamble to serve as an excuse for introducing the discussion with my erudite friend who is editing a magazine of "kultur." Frankly, I was trying to "sell" him on the idea that he should publish something in the way of an article on the financial requirements of the light and power industry, the danger involved in a possible destruction of public confidence, thus stemming the flow of cheap money into the coffers of the public utilities for extensions and improvements, and the unusual economics involved in the operation of our great public services. I may say, in passing, that the editorial policy of this magazine has always been favorable to private ownership and operation; which is as it should be if it really is a magazine of kultur and if the definition of kultur is correct.

Just as frankly, his attitude was "nothing doing," clothed, of course, in the most diplomatic language. Speaking as a representative of his readers, he is not interested in the financial problems of the light and power companies. He believes that the industry is quite big enough to take care of itself and, as an owner of securities in several public utility companies, he feels quite sure that his principal and interest are safe and that nothing which a noisy and small radical minority can do or say will ever destroy the principles of individual initiative and private ownership and operation in this country. Furthermore, he is perfectly satisfied with the rates which are charged and is not interested in any involved discussions of rate structures or rate-making policies.

A REPLY TO SOCIALISM

It beggars wit of man how friend of man
Can postulate that worth should be ignored,
And served, like dole, the national reward
Of power (begot, since social life began,
By vision, thrift, self-sacrifice, the sword),
In equal lot to queen and courtesan,
To dullard, loafer, genius, saint and lord,
The craven and the leader of the van.

Shall mediocrity and worthlessness
By any sort of justice, rape and share
The tribute of devotion, courage, stress?
No body-politic could breathe that air;
But common-sense decided, once for all,
That to the early bird the worm should fall.

Destroy the will to win and who remain
Can sharp our wits, or better our degree?
For nature ever spurns equality
And no two skulls yet held an equal brain.
Strive the unborn shall fight their battle free,
Clean of their blood, unhandicapped and sane;
But moral evolution we disdain
By dedicating all to slavery.

The sons of men you cannot standardize,
Or rate their value ere the same be known.
Our mighty hoard their huge, uncounted prize
Within the hearts of fellowmen alone.
Start the norm fair; then let each brother learn
A man is worth the wages he can earn.

—EDEN PHILLPOTTS
in *Nation's Business*

ALL of which is worthy of note only in that it leads to certain interesting speculation. Is it not just possible that the light and power industry is making an even greater contribution to the progress of civilization than its contribution to material welfare or, as it is more often called, prosperity? Is it not just possible that the person of average intelligence has been thinking dimly about these things and has reached a stage of mental development where he finds them more interesting, more stimulating than discussions about mass production, high wages, national wealth and what not? In other words, is it deserving of consideration in terms of "progress, achievement and efficiency in all phases, practical or theoretical, of political, economic, social, scientific or artistic life?"—briefly, in terms of "Kultur."

I think so. Personally, as a person of presumably average intelligence, the continued statements about the increase in the billions of kilowatt hours used each year have about the same appeal for me as the mortality tables of the life insurance companies. I read the stories issued by the Department of Public Information of the National Electric Light Association, through the medium of its weekly *Electrical News Items* explaining how the demand for power is an accurate index of manufacturing and business activity and, therefore, of general prosperity, and feel like saying: "Who cares?" I study carefully various graphs and charts as well as innumerable tables of statistics and, to borrow a phrase from former Governor Smith, get about as much comfort out of them as I would out of a Chinese laundry ticket.

It occurs to me that those whose duties are to give out information about the light and power industry either confine their definition of prosperity to "the state of well being," or else feel that this being the accepted definition, there is no profit in going beyond it. This, of course, raises the question as to what real prosperity really is and whether or not it has any attributes which place it within the scope of our definition of "kultur."

ABOUT two months ago Jose Bornn, Jr., the financial editor of the *Industrial Digest,* touched on this subject in an important magazine article which began with the question: "What is Prosperity?" According to Mr. Bornn, real national prosperity represents something more than "income tax returns, or pig iron output, or automobile registrations." He even doubts if the fact that the Christmas Clubs throughout the United States distributed in December more than 550 million dollars to thrifty citizens is a factor worthy of very great consideration. He insists on dispensing with slide rules, adding machines, charts, graphs and involved mathematical calculations in his contemplation of past, present and future prosperity, and, brushing aside any and all available statistics, reaches the interesting conclusion that it is nothing more or less than a state of mind—a reflection of prevailing psychology rather than a "tangible statistical entity." But what does he mean by these phrases?

Electricana

DOMESTIC RELATIONS DEPARTMENT

The man who said that electricity is the cheapest thing that comes into the house has never met my husband.—*Sigeco News.*

* * * *

He's probably related to the fellow that's always boasting about running things at home. This guy is a great hand at the vacuum cleaner.

FEDERAL TRADE COMMISSION GETS FACTS

(That's the Way the Heading Reads)

The Federal Trade Commission that is investigating the power trust has appealed to the Public Ownership League for data relative to many phases of the subject which has been supplied to the limit of our time and opportunity.—*From Public Ownership published by Public Ownership League.*

* * * *

Yep. They've called on us, too, and we gave them every fact we had—willingly.

NOTE FOR MRS. WILLEBRANDT

Stranger: "What's your line?"

Bootlegger: "I'm in the public utility game."

Stranger: "How's that?"

Bootlegger: "Oh, I help to keep the public lit up."

Union Electric Magazine

PLAIN LOGIC

First Darky: "What fo' you name yo' baby 'Electricity,' Mose?"

Second Darky: "Well, mah name am Mose, and mah wife's name am Dinah, and if Dinahmose don't make electricity, what does dey make?"—*Open Road.*

MRS. WHEELER EXPLAINS

Jase came hurrying home from a big convention of the Electric Association. Jase had a button on his coat lapel, which had the letters C and E and R on it, with an equal sign and a minus sign between them.

"What does that symbol mean, Mr. Wheeler?" somebody asked in the party.

But Jase did not hear the question, and so the question was asked of me. I do not remember who asked, but it was apparently thought I should know, and of course I did not like to display my ignorance, so I tried to fix up an answer.

"Oh, he has just been to a convention," I said, not noticing that Jase had turned and was listening. "That symbol means, Convention equals Energy minus Reason."

You can imagine how mortified I was when Jase let out a roar of laughter that filled the room. "Correct, correct," he shouted. "It beats the dickens how the women get things right by intuition, where it takes us men years of hard work to get the answer."

Of course after the party was over, he did explain to me that those letters mean that Current equals Energy divided by Resistance. But just the same, I was humiliated beyond words, and it did not make me feel any better afterward, when he told me, a hundred times, how he had made the big engineers laugh with my translation of their symbol.

But why shouldn't I think of conventions when I saw that letter C? It seems to me that there is some kind of an electric convention every week, and that Jase, when he isn't away for some other reason, is attending a convention. I once asked him if there would never be an end of these conventions, and he said no, not as long as some engineer, big or little, bobbed up somewhere with some new discovery about electricity that the others needed to know.

"Electricity is still so new, and our methods of handling is still so crude," he would say, "that we will have conventions until we reach perfection in handling it, and completion in our knowledge of it. Then we will have more conventions, probably, to sit around and pat ourselves on the back."—Jonathan Brooks, in *Chains of Lightning.* Bobbs-Merrill, Indianapolis.

What he is really talking about, in my opinion, is cultural and social progress as represented by demands for improvements in standards of living, and, in so far as those demands are filled, we have prosperity. In fact, he says that prosperity is nothing more or less than a standard of living. He might very easily have gone further and said that, in so far as civilization is concerned, its progress is represented, not by increase in so-called material welfare, national balance sheets and profit and loss accounts, but by the demands of the people for something more—a spiritual demand, if you will—in the way of culture, or, preferably, kultur.

Now we seem to be getting somewhere. If prosperity is nothing more or less than a standard of living and, to return to our definitions, if a steady improvement in standards of living is "progress, achievement and efficiency, in all phases, practical or theoretical, of political, economic, social, scientific, or artistic life," it should be a simple matter to find out whether or not the light and power industry has contributed something more to our lives than mere improvements in food, shelter and clothing, in bank accounts and wordly possessions not usually classified as necessities.

SUPPOSE we take up first the workers—that great group of people whose efforts are, in the last analysis, the basis of all production. If we turn to the statisticians we are told that the average amount of power available to each American worker was 4.27 hp. in 1925 as against 2.11 in 1900, with the amount constantly increasing. This, of course, has largely increased the output per worker which, in turn, has given to the American worker the largest real wage of any worker in the world. He has more money to spend and more time to spend it for the things which mass production has brought within the range of his pocket book.

But time and money to spend do not make for cultural and social progress unless there is some stimulant to a desire for improvement in mental equipment as well as in material comforts. What has electricity done in this direction?

In the first place, the application of the individual electric motor has brought about a tremendous improvement in working conditions. It is no longer necessary to build a manufacturing establishment around a central boiler and steam engine like a barracks. It can be subject to almost any architectural treatment that may be desired. There are modern American factories which, because of their architecture, lawns and flower beds, look more like educational institutions or summer hotels than places where men labor with their hands. There may be a few so-called "practical" business men of an older generation who sneer at this sort of thing and claim that it is only wasted on labor, intent on getting all that it can for the least amount of effort, but they are growing fewer every year and soon will be only a page in the history of industrial development. The character and appearance of the place where one spends most of his working hours has quite as much effect on the character, ability and general contentment of the member of a labor union as it has on the bank president or college professor, and he is just as much entitled to these influences if our prosperity means anything at all.

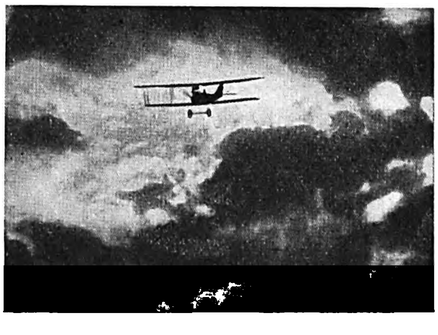
Inside the factory equipped with individual electric motors operated by power from a central generating station the most noticeable thing •is the absence of the dirt which characterized the factory of a generation ago. Who will deny the value of a social influence of this kind? Compare the appearance of the worker in one of these modern factories with the worker in a factory of fifty years ago, and one finds as much difference in their appearance as there is in the appearance of the factories themselves. This influence is bound to permeate the home of the worker and has contributed to the prosperity of the bath-tub, plumbing and other industries which deal in aids to cleanliness.

BECAUSE of the absence of the dirt and dust caused by the old-fashioned boiler and steam engine plus the over-head shafting, pulleys and belting which were necessary, the windows are clean and there is an enormous increase in the amount of light. Good lighting is just as important in a manufacturing establishment as it is in a public school. It means greater comfort, greater safety, a reduction in industrial fatigue and, if we wish to speak in terms of production, an increase in the productivity of the individual worker with considerably less strain. It means not only improved working conditions, but inspires the individual to demand the best of lighting in his home and in the schools attended by his children.

Electricity has given a "dignity" to labor which the worker has never before enjoyed. He is just as much a director of power as the engineer of the Twentieth Century Limited. He is no longer a laborer in the sense that the word was used a few decades ago. Industrial accidents and fatigue have been reduced and the worker's status as "a social person" has constantly improved. He has more leisure and a greater capacity to enjoy it. He demands more in the way of education for himself and his family, and who will say that this is not an even greater contribution to the future of the nation than the accompanying increase in material comforts? And, as Lord Rothermere said after returning to England from a visit to the United States "The day is visibly approaching when practically all the hard manual work of the United States with its 118,000,000 people will be done by electricity, and done far more swiftly and cheaply than human labor could accomplish it." The elimination of manual labor most certainly falls within our definition of "kultur."

Last month I wrote an article for the BULLETIN which contained a description of a modern electrified farm. Electricity has pulled many a farmer away from the chasm of bankruptcy and set him firmly on the high road to prosperity, as meaning material welfare, but what else has it done for him and what will it eventually contribute to agriculture as a whole?

This farm has a house heated by means of an electrically controlled oil burner in the cellar. It has a reading room, dining room, locker room and showers for the "help." It has electric lights, bath rooms, an electric washing machine, refrigerator and vacuum cleaner. It is as completely equipped and up-to-date as any house in the city. Outside there is running water in the barns and other buildings, the water being pumped by an electric motor. Milking, grinding feed and many other chores are also done by motors. The owner, a college graduate, had started with a down-at-the-heel farm, a little money, a lot more that he borrowed, and he is now as prosperous as a small factory owner or a well-to-do merchant in the city. His children will go to college and he and his wife are getting vastly more out of life than the average city dweller.



THIS is not a single, isolated case of an experimental farm. There are today 350,000 electrified farms, and rural electrification is proceeding almost as rapidly as factory electrification did in the early days. In other words, manual labor is being eliminated on the farm just as it is being eliminated in the factory. The farmer himself and his "hired man" have more leisure, more money, a greater dignity of occupation and a new outlook on life. The farm is becoming an individual industrial establishment with working conditions and a mode of living as good, if not better, than that of the city worker. The education of children is no longer a problem. Can it not be said that this is a tremendous progress in both the social and scientific phases of farming? Is so, then it, too, falls within our definition of kultur. Furthermore, as rural electrification progress we can confidently expect to see the so-called "drift from the farm" cease, and there may very easily be a trend in the other direction.

We hear much about the radio these days, and the fact that the millions of them installed in homes is significant of great material welfare. But radio is so much more than a scientific toy designed to amuse, or a symbol of prosperity, that one wonders why its contribution to social progress is overlooked. With it the individual can sit in his own home and attend the political meetings of all parties, weigh the arguments of various speakers, one against the other, and can have no excuse for not attending to the duty of voting with the utmost intelligence. Sooner or later the radio will contribute materially to the breaking down of party lines.

This same individual, if his education has been limited, can go to school, attending lectures by men of national reputation. He can listen to the finest music. He has every opportunity to progress in the social, scientific and artistic phases of life, and once more we find electricity bringing into his home those elements which fall within the definition of kultur.

One could go on almost indefinitely enumerating the things brought into the home or workshop which have contributed not only to the comforts and pleasures of living, but to the mental equipment which make for social and cultural progress without which material prosperity would be an empty thing. Automobiles, pianos, victrolas, all are in the same category. The financial independence accompanying the prosperity of the United States is a great thing, but it is not an end of itself; it is only a means to an end, which is progress, mentally, morally and spiritually.

IN our definition we find the word "scientific." There must be progress, achievement and efficiency in the scientific phase of life. What has electricity contributed to scientific advancement? The great laboratories of the industry in which thousands of scientists are at work have perhaps contributed more to the general health, prosperity and happiness of the people than any other factor in our national life. One has only to visit a modern hospital to see much of the evidence of it. The debt of the medical profession to electricity and to the devices produced by these laboratories for its application to diagnosis and surgery can never be completely told. The industrial chemist, guiding the manufacture of steel, cement and a thousand and one other commodities owes much to electro-chemistry. The dentist, optician, research worker, all know and acknowledge their obligations to applied electricity.

The research work which is going on in these great laboratories is by no means confined to studies which, it is hoped, will directly benefit the light and power industry in one way or another. Take, for example, carboloy, a product of the General Electric Company laboratories. One of the greatest contributing factors to mass production is high-speed steel, "Carboloy" is a new hard steel alloy which will cut steel at speeds and temperatures unheard of in the past. It is so hard that it will scratch sapphires, and next to a diamond the sapphire is the hardest known substance. The new alloy will cut 16-in. battle armor plate and a screw thread on great blocks of plate glass; it will tool porcelain, bakelite and manganese steel—all of them most difficult tasks. The General Electric has been using carboloy in its own shops for more than two years with marked success, not only cutting down the time necessary to complete certain operations from four to ten times, but doing the work at about one-fourth the cost. Now the company hands it to industry, and the whole industrial structure will be immeasurably benefited.

SURGES AND FLASH-OVERS

By FRED W. HERBERT
Director, Service Department, NELA

There will be no BORED walk this year at the N. E. L. A. Convention at Atlantic City, June 3 to 7 and talk about "being lit up," nothing like it ever before.

* * * *

They called the boss "aviator," because he went "up in the air" on the least provocation and always looked down on the rest of the staff.

* * * *

The list of migratory birds should include the one who stops at your desk every time he hears a new story.

* * * *

We were told that poker was a game of chance. We tried it and found there wasn't any chance.

* * * *

The only time pedestrians have the right of way is when in an ambulance.

* * * *

A business conference lasting long and not getting anywhere could be held to advantage on a merry-go-round, where everyone present could ride his favorite hobby.

* * * *

Moving pictures have reached the age of twenty-five years and have just begun to talk. A very backward child.

* * * *

Divorces are putting back into circulation many shopworn husbands.

* * * *

A mother of one of Mr. Vivian's public speaking students stated that her daughter had started so well she was going to give her a course in electrocution to sort of finish her off, so to speak.

* * * *

Don't give advice before it is asked for. Advice is a drug on the market: the supply far exceeds the demand.

* * * *

Agriculturists say to plant bulbs early and reap the blossoms gay. Plant electric bulbs any old time and reap blooming lights.

* * * *

Cigarette lighters, auto tires, radios and flying machines have appeared during the past twenty-five years while the vocabulary of cuss words remains the same.

* * * *

A friend of ours was presented with an unmbrella "with 1000 blessings." Considering the nature of the gift, wouldn't "1000 happy returns" be more appropriate?

* * * *

Fashion note—Scotch tweed suits will have smaller pockets this season.

* * * *

A five-acre farm electrically and scientifically worked, beats twenty-five acres of the old-fashioned careless method.

AND last, but perhaps most important of all, what has the light and power industry done for the women of the country — particularly for the mothers? It has eliminated, once and for all, drudgery in the home. This subject requires little discussion. Every one who reads must know something of the many devices which can be operated for a small monthly charge and which will do most of the hard work of housekeeping better than the average servant or, in these days of temperamental domestic employees, help keep a servant in the house. It has emancipated women from occupations which contributed little or nothing to their own cultural and social advancement, unless one counts tired and aching muscles at the end of the day and signs of age long before they are due as cultural and social advancement. It has given her more time for her children, for self-education, and removed the utterly hopeless outlook of the household drudge: "American homes," says Lord Rothermere, "are depressed by far less of the constant drudgery that disheartens so many English women." That is the word—depressing. Nothing is so depressing as contant, routine labor that holds no interest for the laborer.

And so, if we turn back once more and for the last time to our definition, we find this great industry contributing to that all-inclusive summing up of progress—kultur. It has contributed to the progress, achievement and efficiency of our economic life which has made us the most materially prosperous nation in the world. It has contributed to our political life through the process of education in the great issues of the day. It most certainly has made notable contribution to the many phases of social, scientific and artistic life. What other great industry has done quite so much in this regard?

Some Representative Research Organizations

By Philip F. Siff

STIMULATED by the almost miraculous results obtained under the spur of necessity in our laboratories during the World War, scientific research has since come to play an ever-increasing role in the industrial life of this country. Leading corporations in every line of industry now employ the services of many trained investigators, and expend great sums of money on elaborate research laboratories. The far-seeing men who guide the destinies of these companies are aware that any discovery, even though it appear insignificant, that is made within their fields of operations, may have a vital effect on the future of their companies.

The discovery by German chemists several years ago of a synthetic process for the manufacture of methanol, or wood alcohol, by combining water gas, and steam, threatened for a time to eliminate the American wood-alcohol industry, with a total invested capital of more than $100,000,000. Because of the complex ramifications of modern science, a discovery in one field of investigations may have the most far-reaching effects on industries that are apparently remote. At no time in the history of industrial progress was it truer that elternal vigilance is the price of safety.

IN considering the place of research in industry, the entire emphasis must not be placed, however, on the epoch-making discoveries that have influenced the course of entire industries. Among the major problems of modern research are those of reducing the cost and improving the quality of products and processes already in existence. In a period such as the present, when steadily declining commodity prices have reduced margins of profit in many industries, it is only the low-cost, most efficient producer that may hope to survive. In this economic struggle for existence, the research laboratory has proven itself a weapon of unlimited power.

Mr. Siff is connected with the investment banking firm of Lehman Brothers, New York. He is a graduate of Harvard, and spent two years of study in Europe before commencing his business career in the Statistical and Research field.

It is with these general considerations in mind that we have come to the definite conclusion that other things being equal, the companies which are at present time devoting the greatest amount of energy and money to the problems of fundamental research will, in the years to come, be found leading in the industrial race. Although the money expended in research may seem to the short-sighted stockholder to be needlessly diverted from dividends, over a sufficient period of time, it will be directly reflected in the market price of the company's securities.

In this article a number of the larger industrial research organizations are considered in sufficient detail to give an impression of the thoroughgoing way in which efforts are being made to add to and apply to practical use the discoveries made in scientific investigation.

While those institutions devoted to research in the electrical field may be assumed to be of greatest interest to readers of this publication, several organizations specializing in other fields are considered for the sake of the broader picture of industrial research.

The information on which the descriptions are based has been obtained in part from the publications of the National Research Council, the organization which has been the greatest single force in making the importance of research a matter of general knowledge. and in part from the officials of the companies discussed.

General Electric Company

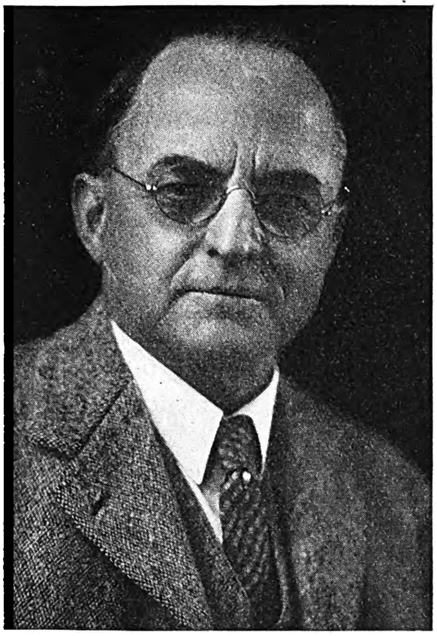
This corporation has for many years carried on extensive researches along very broad lines. Its laboratories are of the highest standing, and among its investigators have been scientists of worldwide reputations.

The company maintains a Research Laboratory at Schenectady which is devoted to general problems, and employs about 350 people. In addition to the Research Laboratory there is a General Engineering Laboratory which performs valuable services in connection with the development of specific electrical devices and maintenance of standards. There are additional laboratories at the National Lamp Works, and at Lynn, Pittsfield, Erie and Fort Wayne.

Among the numerous investigations being carried on by the Research Laboratory, the following are some of the more important: Lamp development; steel research; insulating materials; radio tube development; photo-electric cells; loud speakers; development of extra high voltage transmitting cables; the Langmuir atomic welding method; the new mercury boiler; studies along the lines of electric refrigeration; the Coolidge cathode ray tube, its development and possible uses; synthetic sapphires; studies on the improvements of substitutes for paints and other protective coatings.

At other plants, investigations are being made in the fields of talking movies; television and fused quartz of extra fine quality.

Depending upon the need for investigation at the various plants, the

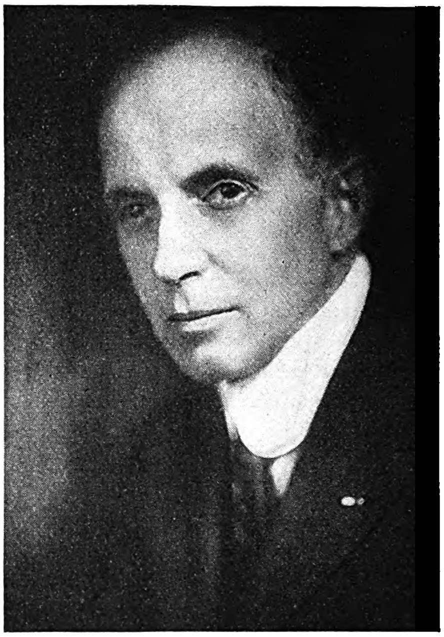


WILLIS R. WHITNEY

Director of Research Laboratories, General Electric Company

C. E. SKINNER

Assistant Director of Engineering, Westinghouse Electric and Manufacturing Company



FRANK B. JEWETT

President, Bell Telephone Laboratories

number of workers employed in research varies between 1000 and 1500; and the total amounts expended are between three and four million dollars a year.

Within the past few years, the following important processes and devices have been placed on the market as the result of discoveries made in the General Electric laboratories: The ductile tungsten Mazda lamp; the Coolidge X-ray tube; improved steel for transformers; improved insulating materials and substitutes for paints and varnishes; improvements in turbine manufacture; a variety of radio tubes; a new highly efficient high-vacuum pump; two new types of loud speakers; and a new scheme of brazing large-sized metal parts together.

Westinghouse Electric and Manufacturing Company

As the second largest American manufacturer of electrical equipment, Westinghouse necessarily maintains an elaborate research organization. Approximately 500 workers are employed by the corporation and its subsidiaries in experimental research and control of materials, of which number about 300 are engaged in the more theoretical branches. Total expenditures for research, testing and development amount to $5,000,000 annually.

The investigations that are now under way are of diverse nature. Numerous studies are being conducted on insulation methods and materials; on magnetic phenomena and means of securing magnetic materials, and on the physical properties of various metals and alloys, with the object of enabling them to better resist severe service conditions. Inquiries are being pursued concerning various kinds of vacuum phenomena, ranging from delicate photo-electric cells, glow discharge devices and a great variety of radio tubes to large metal tank mercury rectifiers.

The corporation's scientists are now studying a number of problems in the field of acoustics, with the dual object of a better production of music and speech, and the elimination of noises produced by different types of electrical machinery.

The "Televocal" system of distant control, a development of the Westinghouse laboratories, recently received the most wide-spread attention in the daily press. This invention, which enables a power despatcher to communicate by telephone with an electrical automaton in a distant substation, receiving reports from and transmitting orders to the inanimate mechanism, seems to bring appreciably closer the dawn of a completely electrified civilization.

Other less sensational products of the laboratories are the improvement of magnetic and insulating materials; vacuum tube devices for radio work; structural steel welding for use in building construction, and lightning arresters for the protection of apparatus in service.

In collaboration with the Baldwin Locomotive Works, the corporation has achieved noteworthy results in the electrification of locomotives and other railway equipment.

Experiments looking toward the transmission of motion pictures by radio have already reached a point where favorable results may soon be looked for.

Bell Telephone Laboratories, Inc.

The Bell Telephone Laboratories, Inc., controlled jointly by the American Telephone and Telegraph Company, and the latter's subsidiary, the Western Electric Company, is undoubtedly the greatest organization in the world devoted to cooperative research. The principle of the Division of Labor, on which modern industry is based, has here for the first time been applied systematically and on a large scale to the solution of scientific and technical problems. Investigations of the utmost complexity are here analyzed into their component parts, which are in turn submitted to groups of scientists and technicians whose training has been along the precise lines of the given work. In this way, vast problems which might well require a life-time of labor on the part of independent investigators, are in the Bell Laboratories solved in the brief space of a few years, or perhaps even months.

An institution of this nature, whose work has a vital bearing on practically all the companies forming the net-work of telephone communication in the United States, must necessarily be a large and complex organization. There are approximately 2000 research physicists, chemists and engineers employed by the Laboratories. Including those employed in various capacities which are not strictly technical in nature, there are about 3700 employees on the Laboratories' payrolls. The total expenditures of the Laboratories are reported to amount to $13,000,000 annually.

THE work of the Bell Telephone Laboratories is carried on by five principal divisions which operate in separate fields, although there is close cooperation between them at all times. Of great importance is the Patent Department, consisting of a staff of more than 100 registered patent attorneys and technicians who advise the research staffs as to which new ideas may be protected by patent, and who maintain a vigilant guard against infringements of the company's patents either in this hemisphere or Europe. In the department's files are copies of 500,000 patent records, which are being added to at the rate of 25,000 a year.

The Research Department is concerned with a development of fundamental physical principles, particularly those relating to the problem of communication. The Apparatus Development Department, as its name implies, has charge of devising all new apparatus that is to be made standard for the associated companies. The Systems Development Department combines and coordinates into smoothly functioning telephonic systems the new apparatus that is developed. The Engineering Inspection Department compares the performance of new apparatus and systems in actual practice with the promise held forth by the laboratory tests.

Although the problems under investigation by the Bell Telephone Laboratories are far too numerous to be enumerated here, the principal fields of experimentation may be briefly indicated. Basic investigations deal with electronic physics, including X-rays; development of new alloys; the nature and characteristics, and the sensitivity and range of the human ear; new vibrating systems, and their application to loud speaking receivers, cones and horns; military and naval communication and signalling; the electrical transmission of pictures, and talking moving pictures.

In the field of switching and controlling transmission, researches deal with manual and machine switching central office equipment and systems; high-frequency carrier current systems for multiplex telephony and telegraphy; remote control of power substations; and a multitude of detailed investigations connected with communication apparatus and systems.

Inasmuch as the American Telephone and Telegraph Company has a virtual monopoly of telephonic communication in the United States, it would seem at first thought that it has not the same incentive to research as companies engaged in more competitive fields. However, in the case of the telephone companies, research has been used not as a weapon with which to ward off the threatened attacks of rivals, but rather as an instrument for improving service and reducing costs. Because of the vast scale on which it operates, the company has the opportunity to effect almost limitless economies.

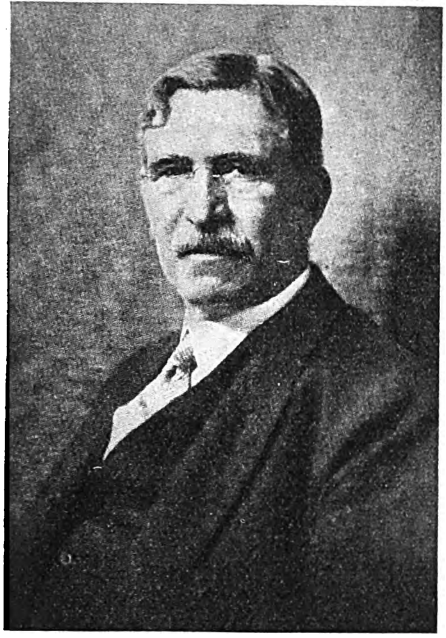
Several arresting examples of such economies may be given here. As the result of the Laboratories' investigations, the company was enabled to replace a standard electrical contact which consisted largely of platinum by a less expensive type. This substitution has resulted in an annual saving of about $9,000,000. By using "Permalloy," a nickel-iron alloy developed by the Laboratories, instead of iron dust for the cores of loading coils, there has been made possible an annual saving of $2,000,000 in the original cost of these coils. The loading coil itself has been an invention of very great importance in the history of the telephone industry. This device, developed in the Laboratories from a basic patent of Professor Pupin's, prevents the distortion and weakening of the speech currents. It has been calculated that if the loading coil had not been perfected, and if the same telephonic facilities that are now enjoyed had been made possible by the use of larger copper wires, the investment in plant equipment would have had to be one-third of a billion dollars greater than it actually is. It is partly due to such colossal savings as these that the company's earnings have increased steadily over a period of years, in spite of the fact that the increase in telephone rates since 1913 has been only half as great as the rise in wages and costs of material.

In addition to these improvements which have a definite money value, there remains a great body of work and discovery whose value can only be expressed in terms of utility and service. There has been the phenomenal development of the vacuum tube, which, in the form of a "repeater" has made transmission possible over distances of four to five thousand miles; and which is the basic factor in multiplex telephony, with its seemingly miraculous phenomenon of five simultaneous messages transmitted over a single telephone circuit. As a result of years of patient experimentation, direct subscriber communication with England was recently inaugurated.

One of the Laboratories' discoveries, known as "Permalloy," an alloy of about 80 per cent nickel and 20 per cent iron, specially heat treated, has remarkable magnetic properties many times greater than those of the best irons and steels hitherto known. Through the use of "Permalloy" in submarine cables, the speed of transmitting messages has been increased more than four times, with a proportionate increase in the capacity of each cable.

AS a by-product of its researches directed toward an exact method of describing and measuring qualities of sound, the company perfected a new type of recording and reproducing phonograph, which, under the trade name "Orthophonic," has been produced commercially by the Victor Talking Machine Company. Other products of these same investigations have been the "Audiphone," a scientific hearing aid for deaf people; and the electrical stethoscope, which promised to be of the greatest value in medicine.

Through intensive development of the photoelectric cell, itself an old discovery, the Laboratories perfected a practical method of transmitting photographs over telephone circuits, so that a picture taken in San Francisco one morning may be published in that evening's edition of the New York papers. In connection with this problem were developed the perfectly synchronized motors which later formed



CHARLES L. REESE

Chemical Director E. I. DuPont de Nemours and Company

the basic apparatus of the well-known "Vitaphone."

It may be seen from the above examples how far-reaching are the results of the work done by the Bell Telephone Laboratories. From the anvils of these busy workshops fly sparks that fall in unexpected places. Here the fine lines of thought are spun into a strong web of communication binding together the entire country.

E. I. Du Pont deNemours & Company

This company maintains laboratories in connection with the following departments: Chemical, Dyestuffs, Technical, Explosives, Smokeless Powder, and Paint, Laquer and Chemicals. Independent laboratories are maintained in addition by these subsidiaries: DuPont-Pathe Film Manufacturing Corporation; DuPont Rayon Company and the DuPont Viscoloid Company.

The principal subjects of investigation lie in the fields of heavy chemicals, paints and varnishes, nitro-cellulose, dyes, vulcanization accelerators; "Semesan" and other seed disinfectants; high explosives, smokeless powder, compositions utilizing nitro-cellulose as a base for protective coatings; motion-picture film; rayon and cellophane; pyroxylin plastics and other molding compositions.

Probably the outstanding contribution to the industrial arts that this company has made in recent years is the development of "Duco," a rapid-drying nitro-cellulose lacquer. Through the use of this product, the auto manufacturers have been enabled to reduce by approximately five days the time formerly required for painting an auto, and thereby save millions of dollars annually.

Another work of the highest importance has been the development of several new vat dyes which have made this country practically independent of the foreign dye producers. Allied to the work in dyestuffs has been the production of rubber accelerators, which are used to shorten the time required for vulcanizing rubber products; and the seed disinfectants known as "Semesan," which increase the yield of agricultural crops by preventing the ravages of plant diseases.

The company has achieved truly remarkable results in the development of a substitute for leather made by coating cotton fabrics with pyroxylin, a cellulose-nitrate composition. The resulting product, known under the tradename "Fabrikoid," is a waterproof, resistant material that can be embossed and finished in grains that simulate natural hides. It is widely used for upholstering automobiles and furniture. manufacturing luggage and wardrobe trunks, bookbindings, wall coverings, and novelty products.

Another product of first-rate importance that has emerged from the DuPont laboratories is a new non-freezing dynamite which can be used safely and economically in the most northern of our mining territories. In order to perfect this product, the company had to readjust 110 dynamite formulas.

The plastic materials, "Pyralin" and "Viscoloid," have been so improved along æsthetic and utilitarian lines that they now have a very wide field of usefulness, being employed for toilet sets, umbrella handles, belt buckles, unbreakable fountain pens, tooth-brush handles and every type of novelty.

The laboratories of the DuPont Rayon Company are continually working to improve their product, which is made by the viscose process. One of their important achievements has been the development of "DuPont Super-Extra," a multi-filament yarn of greater softness than the regular grades. This is now standard in the field of fine underwear, hosiery and velvet.

C. E. K. MEES

Director of Research Laboratory, Eastman Kodak Company

In concluding this account of the DuPont products, mention must be made of photographic film, which is rapidly assuming a more important position on the company's list. Although the manufacture of motion picture film is the youngest of the DuPont Company's ventures, the processes and materials involved are so closely related to those employed in many of their other products, that the company possesses exceptional technical resources available for application to the problems of film production.

Including the workers at the laboratories of its principal subsidiaries, the company has about 1000 employees engaged in all forms of research. Although there are no figures available for current expenditures on research, one may obtain a rough idea of these amounts by means of the figures for previous years. In the period 1915-1918, according to the annual report for 1918, the total expenditure for experiment and research amounted to $3,360,000, an annual average of $840,000. For the seven years 1912 to 1918. total expenditures were $6,051,000 or an annual average of $856,000. During this latter period, according to a statement of Charles L. Reese, Chemical Director of the company, the calculable saving directly attributable to research amounted to $82,401,000, or ever 13 times the cost of the research. It would be difficult to find a better commentary on the value of research. Since 1918. expenditures on research have increased

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largely, owing to the greater number of industries in which DuPont is engaged.

Eastman Kodak Company

In 1878, when George Eastman, then a young bank clerk in Rochester, became interested in photography, the taking of pictures was not the universal and simple pastime that it is today. These were the days of the collodion or "wet" plant process, when the outdoor equipment consisted of a mule-pack of paraphernalia. The early amateur, after having selected a view and set up his dark tent and camera, had to crawl under his tent to sensitize and load his plates, thrust them dripping into the camera, make his exposures and then creep back again to unload and develop them. The transition from this arduous undertaking to the simple art of taking snapshots as practised today has been accomplished through the experimental development of the "dry" roll film. So that from its very inception the great Eastman Kodak Company has been a product of the research laboratory.

In the case of a company such as this, whose very existence is dependent upon research, the laboratories are the heart of the enterprise. Although investigations have been carried on continuously since 1878, when Mr. Eastman first started his experiments in a little room over a shop, the present Eastman Research Laboratories were first established at Kodak Park in 1912. There are on the staff of the laboratories 140 persons, many of whom are chemists, physicists, and photographic experts of the highest training, several enjoying world-wide reputations.

The actual organization of the laboratories cover practically the whole field of chemistry and physics, as applied to photography, and has in addition a special department devoted to photography itself. The following incomplete list of the subjects of study will give some idea of the ramifications of the work: Sensitomestry, illumination, reflection and absorption, colorimetry, spectroscopy, and geometrical optics, inorganic, organic, colloid and physical chemistry, astronomical and spectroscopic chemistry, photographic chemistry, portraiture, color photography, photo-engraving, motion pictures and X-rays.

An interesting sidelight on the laboratories' activities is furnished by the synthetic organic chemical department, which was started because of the dearth of fine organic chemicals in the United States during the World War. If these chemicals had not been supplied, research along scientific, industrial and medical lines would have been paralyzed. This department stepped into the breach and today has available for shipment from stock more than 2100 different organic chemicals of specified purity.

Another perhaps more popular achievement which is credited to the laboratories' research endeavors is the invention of the 16-millimetre Cine-Kodak Safety Film, and the reversal process which have enabled the amateur to make motion pictures as easily as he takes snapshots. By means of this reversal process, the same film which is exposed in the camera is used for projecting the finished picture.

Often the work leads to the production of interesting by-products. An example of this line of endeavor is the discovery that rubber could be deposited from a liquid suspension by an electric current. This discovery has led to the patenting of a process of electroplating rubber solutions that will undoubtedly be of value to the rubber industry.

While the primary object of the laboratories is obviously the improvement and development of the Eastman photographic products, it is not their purpose to limit investigation along purely commercial lines. Research results are almost always published in the leading scientific journals. Since 1913 nearly 300 such communications, dealing chiefly with the theory of photography and allied subjects, have appeared.

A library containing the most complete collection of photographic literature in the world is maintained by the laboratories with a trained librarian in charge of the 10,000 volumes. Subscriptions are maintained for about 200 American and foreign periodicals, and articles therein are abstracted, classified and collected in a Monthly Abstract Bulletin. Translations are made from foreign publications on request, and the facilities of the library are extended to other libraries, institutions and investigators.

Thus the Eastman Research Laboratories have become a great clearing house for the adjustment of all scientific problems connected with every phase of the photographic industry.

The Association Is Planning

The Greatest Convention of Its History

THE 52nd Convention and Exhibition of the Association gives every promise of providing a memorable and gala week.

The Convention coincides with the 50th year of the invention of the incandescent lamp, which will be commemorated with special observances; the new Atlantic City Convention Hall offers facilities unavailable heretofore for such a convention and exhibition as is being planned; the past year has been particularly fruitful in electrical development and spectacular displays and uses of electrical wonders will be made; but above all, the electrical industry will at this Convention pledge its obligations to civilization and fittingly symbolize its leadership in cultural and economic contributions to the world. To these ends, preparation for the most elaborate, comprehensive and inclusive convention and exhibition ever held by the Association have been under way since the curtain came down last June on the 1928 Convention.

The business sessions are being so arranged that the primary function of a convention to afford the interchange of ideas among its delegates will not be neglected, but rather enhanced. The programs for the several sessions are rapidly assuming shape and included in them will be distinguished speakers drawn both from within and without the industry, and from European countries as well. Look for detailed accounts of Convention plans in the April and May issues of the N. E. L. A. BULLETIN.

The opening date of the Exhibition to be held in conjunction with the Convention has been advanced to Friday, May 31. The Convention dates remain June 3-7 inclusive, the Exhibition to continue throughout this period.

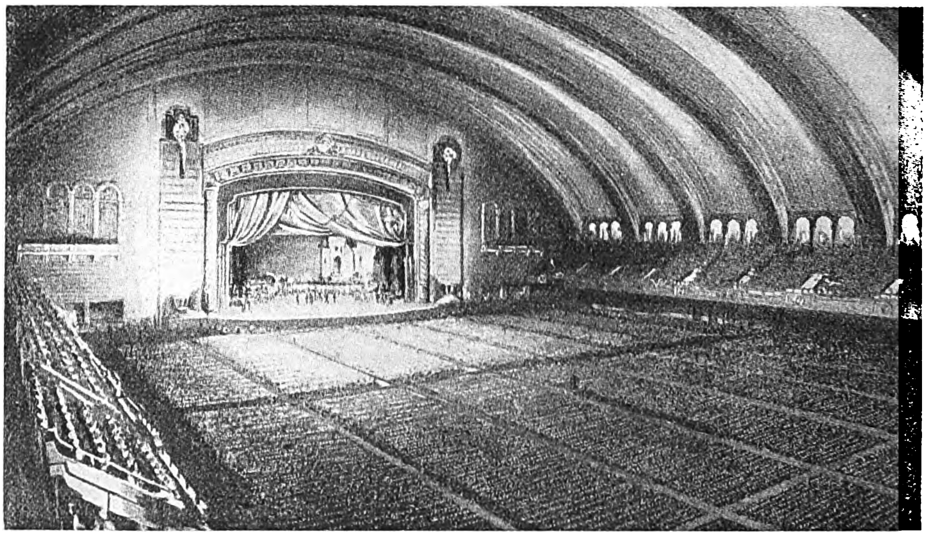
The year 1929 will be celebrated throughout this country as Light's Golden Jubilee, and the opening phase of the celebration will be inaugurated at the N. E. L. A. Convention and Exhibition, with a grand Festival of Light, accompanied by the formal dedication and opening of the new Atlantic City Auditorium on Friday, May 31.

For Atlantic City this will be not only the Golden Jubilee of Electric Light, but also the Diamond Jubilee of Atlantic City as a municipality. The opening of the new $15,000,000 auditorium will be with great pomp and ceremony. Thousands of delegates will arrive in advance of the Convention to participate in these functions, including President Arkwright of the N. E. L. A. and many other electric light and power company executives.

The Festival of Light, beginning Friday, will be conducted throughout the Convention as Atlantic City's contribution to the N. E. L. A. Convention and its program for celebrating Light's Golden Jubilee. A grand inaugural ball in the new ballroom of the auditorium is planned for Saturday night, June 1. The dedication and opening ceremonies of the new auditorium were planned for an earlier period, but have been postponed to May 31 as a compliment to the National Electric Light Association and the electrical industry as a whole.

These social functions and the N. E. L. A. Exhibition will be given wide publicity by Atlantic City, and the railroads are planning to run many special trains to Atlantic City, Friday, May 31, Saturday, June 1, and Sunday, June 2.

With these facts and many details of the program in mind, the Exhibition Committee has therefore unanimously voted to move forward the opening date of the Exhibition in order that exhibitors may take advantage of the unprecedented opportunity to place exhibits before an audience of the general public drawn from all parts of the country. In the two days before the opening of the Convention, the public will be permitted to view a collection of electrical apparatus unparalleled in range and completeness. This will provide an educational opportunity of no small importance to the central station industry and show the public a wide variety of heavy apparatus and appliances which are the very backbone of the generating and distribution systems supplying them with electricity but which they have heretofore had no opportunity to examine.



Main Auditorium of Atlantic City Convention Hall

The exhibition will be staged in this gigantic theatre. It is 350 ft. wide by 650 deep and contains 168,000 sq. ft. of exhibition space on the auditorium floor. The entire permanent population of Atlantic City, 66,000, could be seated in the building—with room to spare

H. M. Byllesby Prize Paper

The Accountant's Place in the March of Progress

By L. W. Clark

THE place which the accountant is destined to fill in the business organization of tomorrow is a subject which at once commands attention and demands consideration. In order to appreciate the underlying truth of this statement it is only necessary to scan the business horizon of today. The trend in modern business is toward larger and still larger business combinations. Undoubtedly, the public utility industry has been one of the pioneers in bringing about this situation. Briefly, the *raison d'être* of these large combinations is the fact that very great savings in the buying, processing and marketing of commodities can be effected in this way. However, these savings will be more than offset by losses if the business organization is loosely managed.

This is the situation which presents a challenge to the accountant. Whether or not the gigantic business organizations of tomorrow are going to justify their existence will depend to a considerable extent on the ability of the accountant to meet the situation. The information which the accountant is able to furnish, by virtue of his training, is as vitally important to the management in shaping business policies as the compass and sextant are to the navigator in keeping his ship on a predetermined course.

Mr. Clark's paper won the H. M. Byllesby second prize for 1927-1928, *awarded last June at the* 1928 *N. E. L. A. Convention, Atlantic City. Mr. Clark is a native of Utica, New York, and after graduation at Colgate University in* 1923 *was employed for two years in New York City He has been with the Utica Gas and Electric Company since January* 1925 *and is at present Statistician of that company*

BEFORE attacking the problem of how to increase the usefulness of the accountant in the public utility industry it will first be necessary to deal with the parallel problem of what constitutes usefulness. By formulating what might be called a yardstick of usefulness it will be possible to measure progress toward the ultimate goal, which in this case is the solution of the above-mentioned problem. This will also lessen the possibility of wandering aimlessly in a sea of suggestions and make it possible to drive steadily toward the objective. In order to accomplish this, it will prove helpful to disregard, for the time being, the business superstructure which embodies all of the complexities of modern business organization, so that attention may be centered on the foundation which underlies all sound business practice.

Upon examination, this foundation reveals itself as being the practice of satisfying wants or rendering services. Before building on this foundation, however, it becomes necessary to study the economic forces which must be complied with if the structure is to attain any size or importance. In the first place, there is a very definite limit to the amount of money which the average person is willing to pay in order to have a certain want satisfied or a particular service rendered. This makes it imperative that the charge made for a service be in proportion to the value of the service. If the service charge is placed at too high a level, the business will not only suffer from a greatly restricted market, but in most cases the way will be paved for a competitor to enter the field and underbid, thereby taking away the business. In the second place, the financial affairs of the company must be managed in such a way as to breed confidence through the assurance of permanence, stability and earning power. Occasionally, it becomes necessary for practically every business organization to seek outside capital in order to meet unusual requirements such as might be due to a period of abnormally small sales or the necessity of providing for additions to plant or equipment. If the financial affairs of the company have been managed in such a way as to assure confidence, there will be no difficulty in obtaining the necessary money. On the other hand, if the financial affairs have been poorly managed, the result will be a lack of confidence and the money will not be forthcoming to sustain the business during the critical period. This will, in turn, lead to bankruptcy or receivership. By keeping these truths in mind it will now be possible to build a large and permanent structure on the foundation which has been provided.

A SUMMARY at this point will help to reveal more clearly the progress which has been made toward determining what constitutes usefulness to the public utility industry. The statement that profits are the life blood of business is commonly accepted as axiomatic. It follows directly from this that the usefulness of any agency in business depends to a very great extent upon its ability to increase the profits of the business as a whole, for the simple reason that the very existence of business depends upon the fulfillment of this condition. In the foregoing material three basic truths of business have been outlined, the observance of which will lead to greater profits and increased business. The success of the public utility industry, as well as any business organization, depends upon the extent to which these truths are emphasized and put into practice. Briefly, these truths are as follows: the rendering of better and more complete service, the control of operating costs so as to provide the service at the lowest possible charge, and the financing of the organization in such a way as to assure the obtaining of additional capital at advantageous rates when business conditions make it necessary.

In as much as it is imperative that business activity and effort be directed toward these three objectives if the profitableness and stability of the organization is to be increased, it can readily be seen that the usefulness of any member of the organization can be very definitely measured by the extent to which he cooperates in this general program. This provides a yardstick of usefulness by which it is possible to evaluate the efforts of any particular part of a large business organization. The problem has now been narrowed down to the determination of what it is possible for the public utility accountant to accomplish, within his sphere of activity and by means of the tools with which his specialized training has provided him, toward helping the management of public utilities to correlate the vast number of activities within the industry and to direct them more wisely and efficiently through the three channels which have been mentioned in order that the industry as a whole may grow in prosperity and stability.

THE providing of better and more complete service presents a number of real opportunities for the public utility accountant to increase his usefulness to the industry in as much as he usually has jurisdiction over Meter Reading, Billing of Consumers, Credits and Collections, Adjustments and the Cashiers. All of these activities have to do with that phase of the business commonly spoken of as public relations and for this reason there is a possibility of doing a considerable amount of good or conversely causing a great deal of damage. It is within the power of the Meter Readers to create an enormous amount of good-will for the company because of the large number of contacts made during the course of their daily rounds. In addition to their duties it is very important that they deal with the customers in a polite and courteous manner. Furthermore, by giving the Meter Readers a short course of training it would be possible for them to answer a great many minor complaints concerning company policy, service rendered, appliance defects, etc. In cases where the problem involved is too complex or the time required too great he could refer the customer to the proper individual or department of the company. This would tend to convey to the mind of the customer the impression that the company is very anxious to provide them with satisfactory service and would have the effect of dislodging from the minds of dissatisfied customers the prejudice which takes root so easily.

With respect to the billing of consumers it is extremely important that accuracy be emphasized. It is very difficult indeed for the average customer to overlook a mistake in billing even if the service rendered is absolutely satisfactory in every other respect. For this reason an added amount of emphasis should be placed on this part of the work. The bill which is mailed to the customer should have the terms of payment printed on it in a conspicuous place. It is also helpful to print on the bill a diagram of the meter dials with a brief explanation of how to read them and a schedule of existing rates. Although this may seem unnecessary it is nevertheless instrumental in establishing confidence in the minds of the customers. The practice of allowing ten days for the payment of bills is generally followed by the utilities. However, there is a difference in the application of this rule. Some utilities have chosen to bill the customer net with the addition of a penalty charge for non-payment within the ten day period while others have chosen to bill the customer gross, with the allowlowance of a discount for payment within the ten days. Although the net result is the same in either case, nevertheless, there is a psychological factor involved which it will be worth while to note in passing.

The judgments of people are very greatly influenced by precedent or established practice. It is a very common occurrence in the business world for a person to be granted a discount for the prompt payment of a bill but it is a very rare occurence for a person to be charged with an amount additional to the cost of the commodity because of the fact that the bill was not paid within a comparatively short period. Very often the latter practice arouses a feeling of antagonism in the mind of the person concerned and although there may be no justification for it whatever, nevertheless, it may be expected with a reasonable degree of certainty. On the other hand, it may be argued that the rate is based on cash within ten days, that the customer who pays his bills promptly should be favored and that it is advantageous from a bookkeeping standpoint to bill the customer net. Nevertheless, the fact remains that billing customers with the gross amount and allowing the discount is a comparatively easy way to build up the confidence and good-will which is worth so much to the company. The management of Credit and Collections is another important link in the public relations end of the business. Here, again, it is very important that accuracy be observed in keeping the records because an immense amount of ill-will can be caused by the failure to O.K. the credit of certain customers who are conscientious in their payments. In connection with adjustments and the work of the cashiers, it is very important that the customers be treated with politeness and courtesy. In managing the work of adjustments it should be borne in mind that although the complaint may seem very trivial from the standpoint of the utility, nevertheless it is probably all important to the mind of the customer.

THE control of operating costs to the end that service may be provided at the lowest possible charge, presents another fertile field for the accountant. By cooperating with the different operating departments it is possible for the public utility accountant to aid them in cutting out unnecessary expenditures. An effective control can be maintained over operating expenses by furnishing a report to the heads of the different operating departments at the close of each month, showing the expenses of the respective departments itemized by accounts as compared with the same month of the previous year. This will call to their attention any radical changes in the cost of operating the departments. The public utility accountant can also increase his usefulness by preparing a number of charts, which are very valuable from the standpoint of management in gaining a more accurate conception of what is transpiring in the operating departments. For example, the operating expenses may be plotted against the sales by means of index numbers, using a normal year or period of years as a base. Somewhat the same results may be obtained by plotting the operating ratios, or in other words, the ratio of total operating expense to gross operating revenue. These charts will tend to show any abnormal increases in operating expenses over a period of years, and these increases in turn may be traced to individual departments. A chart may be prepared showing the investment in plant and equipment per dollar of gross revenue received. This will show whether the gross revenues have kept pace with the increases in investment over a period of years. If the system is overbuilt, this fact will be shown on the chart. Interesting comparisons can be made by showing on this chart comparable figures for other companies or for the country as a whole, as they are published by certain statistical organizations.

IF the management is desirous of obtaining information concerning how efficiently the generating facilities of the system are being utilized, a chart may be prepared showing the variations in load factor over a given period. The points as they are plotted on this chart will show how the average demand over a certain period compares with the peak demand for that period. This information is important because the public utility industry has, relatively, a very large investment, and for this reason it is of vital importance that the equipment be used as efficiently as possible. If the load factor can be increased, this will make it possible to lower the rates and this in turn will result in increased business. The only way by which public utility management can increase the load factor is through the type of new business which is added to the system. For this reason, such a chart should prove valuable to the management in directing the activities of the New Business Department.

Another chart may be prepared showing the different plant factors. This will indicate how the average output of each plant compares with its capacity. This chart will prove helpful to the management in determining how efficiently each of the generating plants is being operated.

FINAL NOTICE
N. E. L. A. PRIZE AWARDS COMPETITION

All papers to be entered in the 1928-1929 N.E.L.A. Prize Awards Competition must reach the Secretary of the Association, 420 Lexington Ave., New York N. Y., before April 1, 1929.

The cash prizes total $1,900, and awards are offered to cover papers on all fields of the electrical industry:

The prizes are:

DOHERTY PRIZE—A gold medal donated by Mr. Henry L. Doherty, president of H. L. Doherty & Company, for the best paper on any subject relating to the electric light and power industry.

HARRIET BILLINGS PRIZE—A cash award of fifty ($50) dollars donated by Miss Jane Eglin, in memory of her brother, the late Dr. William C. L. Eglin, former vice-president of the Philadelphia Electric Company, in recognition of the late Miss Billings' services to the association as secretary in its early days, for the second best paper on any subject relating to the electric light and power industry.

H. M. BYLLESBY ACCOUNTING PRIZE—Cash awards of two hundred and fifty ($250) dollars, one hundred and fifty ($150) dollars, and one hundred ($100) dollars, donated by H. M. Byllesby & Company, in memory of Col. H. M. Byllesby, for the three best papers showing how to increase the usefulness of the accountant in the public utility industry.

MARTIN J. INSULL PUBLIC RELATIONS PRIZE—A cash award of two hundred and fifty ($250) dollars donated by Mr. Martin J. Insull, president of the Middle West Utilities Company, for the best paper dealing with public relations in the electric light and power industry.

JAMES H. MCGRAW ENGINEERING PRIZE—Cash awards of two hundred and fifty ($250) dollars, one hundred and fifty ($150) dollars, and one hundred ($100) dollars, donated by Mr. James H. McGraw, president of the McGraw-Hill Publishing Company, for the three best papers on any engineering or technical subject relating to the electric light and power industry.

JAMES E. DAVIDSON COMMERCIAL PRIZE—Cash awards of two hundred and fifty ($250) dollars, one hundred and fifty ($150) dollars, and one hundred ($100) dollars, donated by Mr. J. E. Davidson, president of the Nebraska Power Company, for the three best papers dealing with commercial or merchandising problems of the electric light and power industry.

FRANK W. SMITH EDUCATIONAL PRIZE—A cash award of one hundred ($100) dollars, donated by Frank W. Smith, vice-president and general manager, United Electric Light and Power Company, to the person making the most creditable showing in the educational courses provided by the National Electric Light Association.

Complete details appeared in the December and January numbers of the N. E. L. A. Bulletin. If these issues are not available, full information will be mailed upon request to the Secretary, National Electric Light Association.

Other charts may be prepared which will help the management in visualizing what changes have taken place in connection with the sales of electricity and gas. For example, a chart may be prepared showing the variation in the different sales classifications over a period of years. This in turn may be divided so as to show the variations in both the kw-hr. sales and revenues by classifications for the electric department and the MCF sales and revenues by classifications for the gas department. Another chart may be prepared showing the variations in the average rate received for each of these sales classifications. These charts taken collectively will enable the management to obtain a very clear-cut conception of what changes have taken place in the different operating departments as well as providing a satisfactory sales analysis.

The next problem to be dealt with is in connection with the financing of the business. Because of the relatively small earnings of public utilities it is practically impossible to appropriate enough money from earnings to provide for very extensive additions to plant and equipment. This condition makes it necessary to obtain large sums of money through the sale of stocks and bonds. Consequently the payment of bond interest and stock dividends requires a relatively large portion of the net earnings. Recently, the public utility industry has been doing a considerable amount of financing through the sale of preferred stock, of which a large portion has been of the cumulative variety. This type of security finds a ready market because of its appeal to a large number of investors who are conservative in their buying.

WHEN it becomes necessary for a public utility to sell securities in order to obtain additional capital, it is very important that a wise choice be made with respect to the kind of security to be issued so that a sound financial structure may be maintained at all times. The bond holders, considered collectively, are in possession of a mortgage on the property. This means that as soon as a public utility is unable to pay its bond interest there is grave danger of receivership or bankruptcy. For this reason it is necessary to keep the amount of bonds issued within certain definite limits so that the smallest earnings which may reasonably be anticipated will be ample to care for the bond interest. It is also true that a public utility cannot pass dividends on its preferred stock without serious consequences. Although it is more important that the bond interest be paid, it is nevertheless true that if the cumulative preferred stock dividends, or even the non-cumulative preferred stock dividends, are not paid for a considerable length of time a serious situation will develop. The investing public will lose confidence in the business and it will be extremely difficult to float any new securities on the market. In order to maintain a strong financial position, it is necessary that the holders of the common stock absorb any variations which may occur in net earnings due to changing business conditions.

More Electricana

AT LAST A SATISFACTORY DEFINITION

Electricity is something that starts the Lord knows where and ends in the same place. It is 1/36 of a second faster on its feet than its nearest competitor, backyard gossip, and when turned loose in Europe will get to the United States five hours before it starts. Nobody knows exactly what it is because it has never stood still long enough.

Electricity is sometimes known as science gone crazy with the heat, and if you can understand its manoeuvres you can do anything with it except open a can of peanut butter at a picnic.

Electricity was locked up in ignorance for centuries until Ben Franklin let it out with a pass key, and since then it has been pulling off more new stunts than a pet monkey.

With it you can start a conversation or stop one permanently, cook dinner, curl your hair, press your trousers, blow up a battleship, run an automobile or signal Mars, and many more things are being invented.—*New York Utility Bulletin.*

To Be Set to Music
ELEC

Elec, do the washing,
Elec, press my clothes,
Elec, whatever are you,
Goodness only knows.

Elec, start the refrigerator,
Elec, freeze some cream,
Elec, you shocking creature,
To touch you makes me scream.

Elec, cook my dinner,
Elec, curl my hair,
Elec, when I reach for you,
You are right there.

Elec, turn the fan on,
Elec, now some heat,
Elec, you're so swift it seems
You have a million feet.

Elec, turn the lights on,
Elec, the radio,
Elec, when I'm without you,
My gladness turns to woe.

—Gertrude Totten *in A.G.E. Bulletin*

* * *

Elec, take a message
Half the world around.
Elec, through the ether,
Carry sight and sound.

Elec, run the smelter;
Gold from dusty ore.
Elec, heat the furnace,
Whence our wealth shall pour.

Elec, willing servant,
Aid in home and farm.
Elec, housewife's helpmate,
Clean and freeze and warm.

Elec, docile giant,
Turn the wheels of trade.
Elec, drive the motors,
Mass production's aid.

Elec, angry Titan,
Scourge of ancient Jove.
Elec, safely harnessed,
Gentle as a dove.

Elec's work is never through,
In home and shop and mine.
Elec's seeking more to do,
Mystic force benign.

—W. M. C.

HERE again the accountant may increase his usefulness to the industry by furnishing the management with data and charts by which it is possible to ascertain very quickly and accurately the financial condition of the company at any given time. For example, a chart may be prepared on which is plotted the income by months after operating expenses have been deducted. Against this may be plotted the requirements for bond interest and likewise the requirements for preferred stock dividends. This chart will show very strikingly the difficulty encountered in meeting these requirements. Another chart may be prepared showing the earnings on common stock and plotted against it the amount of dividends which have been paid on common stock. This chart will show at a glance the amount earned on common stock, the relative amount of earnings paid out in dividends on common stock or vice versa, the relative amount drawn from surplus with which to pay dividends. A chart may be made showing the disposition of the gross income between interest on notes, bond interest, preferred stock dividends, common stock dividends, surplus or any other items such as amortization which may be deducted from the gross income. This chart will show the relative amount of gross income consumed by each of these items, and if the financial structure is poorly balanced in any way, this fact will be shown very noticeably on the chart. Still another chart may be provided showing the rate of return on investment. This may be obtained by dividing the net earnings by the amount of money invested. The amount of the investment may be determined with a fair degree of accuracy by adding to fixed capital a representative figure for accounts receivable, a like amount for materials and supplies and an estimate of the working capital required, sometimes computed on the basis of forty days' operating expense. This chart will show with reasonable accuracy the rate of return which has been earned on the money invested in the business. The charts which have just been mentioned will make it possible for the accountant to increase his usefulness by providing the management with a great bulk of accounting information in a very concise and usable form. With this information at hand, the management should be able to conform more closely to the third fundamental of business practice as it has been outlined in the preceding paragraphs.

THE public utility industry of the future must necessarily be a creation of the mind. It will be shaped and molded by different forces as time moves onward and business conditions change. Out of the chaos and confusion arising from these ever-changing conditions, one factor may be discerned which is always present and is conspicuous because of its steadfastness and inflexibility. This factor is the spirit of progress which is constantly at work in shaping business organizations. This is the motive power behind the ever-changing methods of the business world. The most valuable business men of today are those whose thoughts and actions are not restricted to the business practices of today, but who have the courage and vision to anticipate the goal toward which the march of progress is taking them. The anticipation of this goal requires a careful and thorough study of the fundamental economic laws which govern business. This fact has made it necessary to outline at the beginning of this article certain economic forces which must be dealt with if the public utility accountant is to increase his usefulness to the industry. Following this a number of suggestions have been made in order to show how the accountant may direct his efforts in such a way that they will be in closer harmony with these forces. The public utility accountant who places sufficient emphasis on these truths will be able to anticipate the trend of business progress, and in this way greatly increase his usefulness by helping his industry to attain a higher level of profitableness and stability.

Electric Heat: *An Economic Paradox?*

By B. S. Havens

General Electric Company

THE tremendous rate of increase in the use of electric heat in industry during the last few years has stimulated an interest in a subject which, upon investigation, discloses a number of curious facts. Those who are unfamiliar with the details, but who are, nevertheless, acquainted with the cycle through which the electric energy passes, are likely to think they see in the use of electricity for this purpose an economic waste.

Were the cost per heat unit the only factor to be considered, electric heat would, without question, be an economic paradox, to be discarded by a modern business man as quickly as he would discard a suggestion to use perpetual motion in his manufacturing processes. And yet, by reason of other advantages, electric heat is frequently found to be cheaper, from a standpoint of overall cost, than any other form of energy.

Electric heat should be considered a tool in industry much as is the hammer, the saw or the drill, and as such it should be analyzed and its merits weighed. The most important advantages, then, of this electric heat tool, are as follows: High quality, close control, simplicity of application, cleanliness and improvement of working conditions, flexibility and, finally, the possibility of lower overall costs. Cases where all these advantages are combined in one installation are not rare, yet seldom is more than one or two of them necessary to influence the choice.

WANTED
A Slogan
to
Promote
ELECTRIC HEAT

Seven prizes, totaling $500, will be awarded by the National Electrical Manufacturers Association and the National Electric Light Association for the best slogans to promote the use of electric heat in industry.

Each contestant may submit not more than three slogans and each slogan must be accompanied by an analysis not exceeding 100 words. Preference will be given to brevity in slogans. The awards will be made on the basis of the best slogan and analysis. First prize will be $250, second $100, third $50, and four of $25 each.

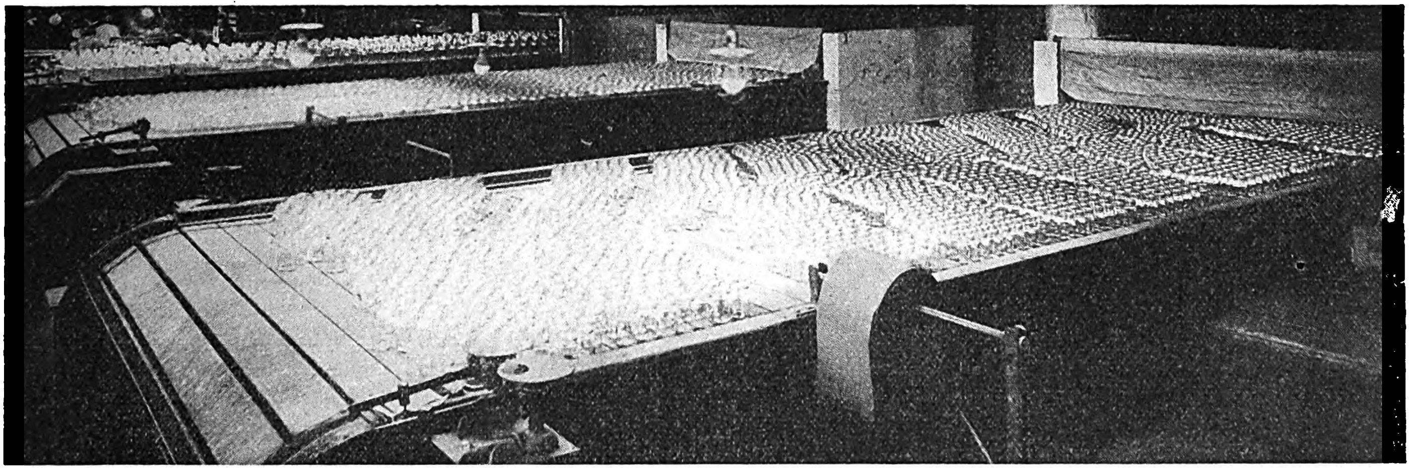
Slogans should be broadly descriptive of the possibilities and advantages of electric heat in industry.

Contestants should submit each slogan and its accompanying analysis on a separate sheet. The contestant's name and address should appear *only* on the outside of the envelope which should be addressed to "NEMA—NELA Slogan Contest, National Electrical Manufacturers Association, 420 Lexington Ave., New York City." Slogans must be mailed before midnight, May 30, 1929, at which time the contest closes. Results of the competition will not be made public before June 30, 1929.

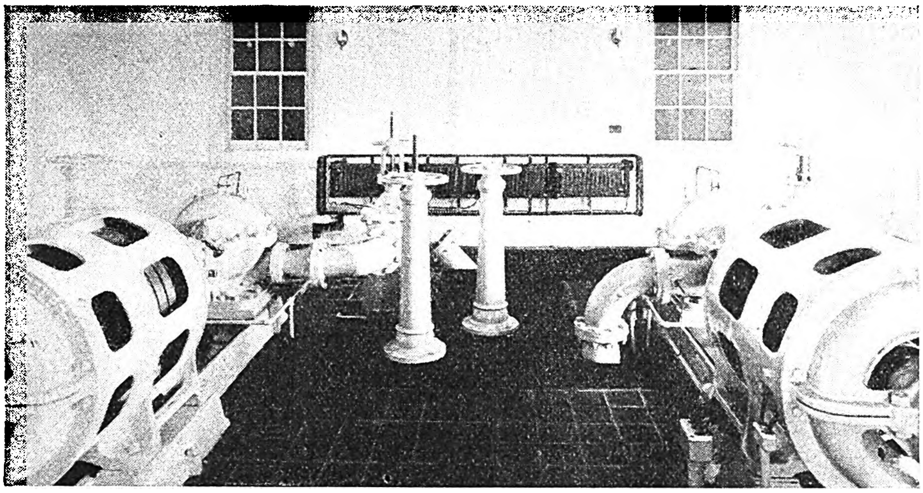
It is suggested that N. E. L. A. members inform their industrial customers of the details of this slogan contest. The resulting publicity on the wide applicability of electric heat in industry will prove mutually beneficial.

An example directly at hand involves the printing industry, without which this periodical could not be published. The type forms from which this page was made are cast from stereotyped metal maintained in a molten state in what are known as stereotype melting pots. A year or so ago the common means of reaching and maintaining the necessary heat was, gas. Then the Waterbury *Republican-American* tried electricity. The gas-heated pot which had been used consumed approximately 131,000 cu. ft. of gas per month at a cost of $1 per thousand cubic feet, making a total of $131 per month for fuel. The new electrically heated pot was found to consume an average of 8000 kw-hr. of electricity per month, costing 1.25 cents per kilowatt hour, reducing the monthly fuel cost to $100, or an immediate saving of $31 per month.

One of the most important advantages resulting from this installation, however, was found to be the ease and simplicity of operation. In the original installation, with gas heat, it was necessary to maintain a continual close watch of the metal. When the pot was not in use it was customary to hold the temperature at about 450 deg. Fahr. in order to bring it up to the operating point as quickly as possible



Rear view of battery of three electrically heated glass lehrs, heating chamber of each lehr 9 ft. wide, 50 ft. long by 2 ft. high—240 kw. per lehr maximum operating temperature 1200°*F.—Illinois Pacific Glass Co., San Francisco, Cal.*



Automatic pumping station, heated automatically by 3.8 *kw. electric air heaters, total installation* 30 *kw.,* 440 *v.,* 3 *phase. Town of Morristown, N. J.*

when necessary; with electric heat this was accomplished automatically by means of an automatic control panel and a thermostat with a sensitive bulb in a well in the pot. Little more than a half-hour was found to be needed to bring the metal from the stand-by temperature of 450 deg. Fahr. to the operating temperature of 620 deg. Fahr.

Where high quality product is an important factor in any manufacturing process involving the use of heat, electricity brings very gratifying results. One manufacturer of glass bottles installed electrically heated lehrs for annealing, but also continued to use his older fuel-fired lehrs. He soon found that his customers were insisting on one grade of bottles, and an investigation disclosed the fact that these bottles were invariably those annealed electrically. The close control resulting from the use of this method allowed the manufacturer to cool the bottles more uniformly and at a definite rate, eliminating the possibility of strains set up in the bottles which would allow easy breakage. In addition, operating economies of the electric equipment were found to compare favorably with those of the old equipment, and maintenance charges were negligible.

Often a set of circumstances will exist which practically demand the use of electricity for generating heat. For instance, an Illinois coal company provides bath water for its employees. A steam-heating system was employed to heat the water to the proper temperature, and is still used on work days. This requires about five tons of coal per day and the services of three firemen for its operation. Because of the necessity for the employment of maintenance and construction men, this system had to be kept in readiness on idle days and holidays as well as on working days, and at no reduction in cost over the expense of operation on working days.

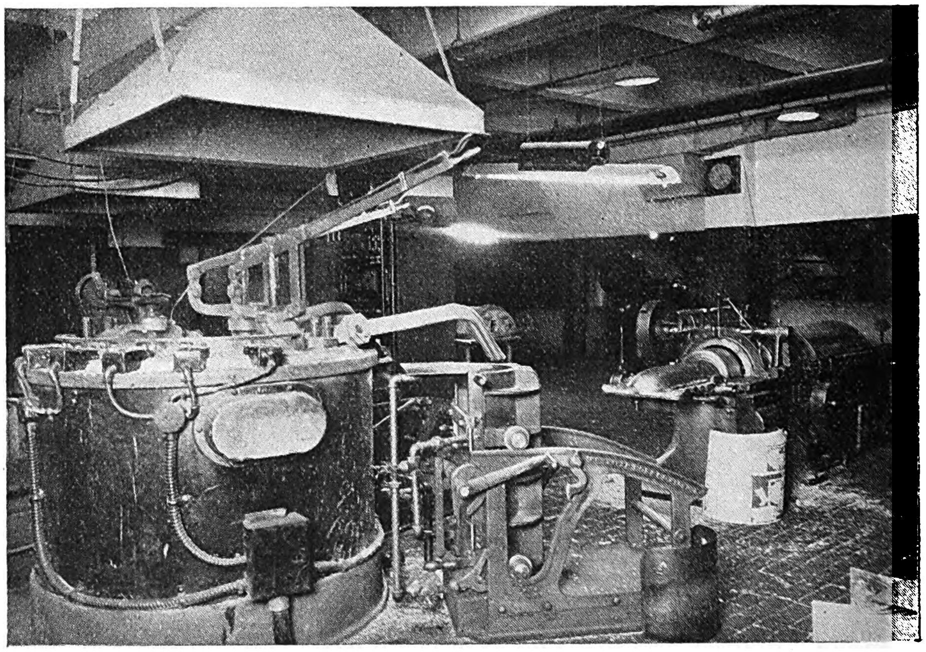
As much less water was needed on the "off" days, it was decided to try electricity for heating the water. An electric heating system was therefore installed. By means of this the water reaches bath temperature in three minutes after the current is turned on, and thereafter meets, without delay, all holiday demands. It was found that the cost of steam operation was $34.25 per day, while that of electric heat, used on idle days, is only $7.64, resulting in a decided saving. The steam expense, of course, included the cost of five tons of coal and the wages of three firemen.

Sometimes electric heat serves odd purposes. A manufacturing company in Pennsylvania wished to serve a turkey dinner to its employees and, casting about for a means of cooking the turkeys, hit upon the idea of using an electric annealing furnace in its plant. The temperature control was set at 405 deg. Fahr., the furnace preheated and the birds put in. Satisfied diners reported that the birds were perfectly cooked.

The fact that electric heat can be applied automatically has much value. The town of Morristown, N. J., has an automatic pumping station, located at some distance from the town, for maintaining water supply. As the building is located in an exposed position, it was found there was constant danger of freezing the pumps in winter weather, and thus interrupting the supply of water. An installation of electric heaters was made, together with a system of temperature control, and now a constant temperature of 50 deg. Fahr. is maintained automatically even when the outside temperature falls to 10 degrees below zero. This method has also been successfully applied by other municipalities and by public utilities.

One of the great advantages in the use of electric heat is the ability to

(*Continued on page* 192)



5 *ton electrically heated stereotype pot.* 45 *kw.,* 220 *v.,* 3 *phase. "Waterbury Republican and American," Waterbury, Conn.*

Design of High Voltage Outdoor Substations

PART IV

(Conclusion)

A series of six discussions on design of outdoor substations originally presented at a meeting of the 1926-1927 Electrical Apparatus Committee, Engineering National Section, H. R. Woodrow, chairman. The meeting at which these discussions were presented was conducted by the Substations Subcommittee under the chairmanship of R. A. Hentz.

Substations discussed in this series are: The Philadelphia Electric Company, by Raymond Bailey; Detroit Edison Company, by S. M. Dean; (December, 1928)—Commonwealth Edison Company, by B. G. Jamieson; Pacific Gas & Electric Company, by B. D. Dexter; (January, 1929)—Duquesne Light Company, by G. Sutherland; (February, 1929)—Alabama Power Company, by L. M. Smith (this month).

◆

ALABAMA POWER COMPANY

L. M. Smith

IN the design and construction of outdoor substations to serve widely separated industries and communities we have found it necessary to give serious consideration, first, to the use of automatic equipment, second, to the standardization of structures, buildings, fences, ground systems and certain kinds of equipment, and third, to rigid inspection.

Our engineering organization as far as it affects the construction of substations, is divided into five sections, each of which have a managing head who reports directly to our Electrical Engineer. These five sections are: (1) Primary Substations, (2) Customers Substations, (3) Transmission Lines, (4) Distribution Lines, and (5) Com-

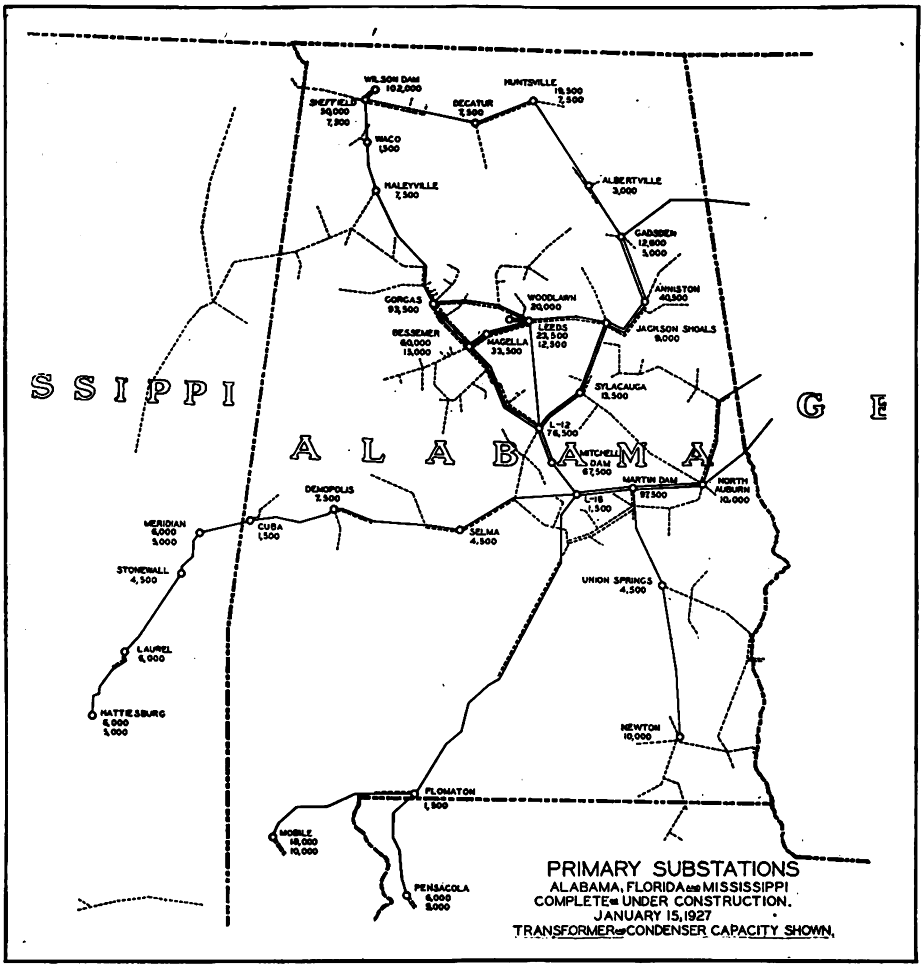

WILSON DAM 102,000
SHEFFIELD 30,000 7,500
DECATUR 7,500
HUNTSVILLE 19,500 7,500
WACO 1,500
HALEYVILLE 7,500
ALBERTVILLE 3,000
GADSDEN 12,600 5,000
ANNISTON 40,500
GORGAS 93,500
WOODLAWN 20,000
LEEDS 23,500 12,500
JACKSON SHOALS 9,000
BESSEMER 60,000 15,000
MAGELLA 33,500
SYLACAUGA 13,500
L-12 76,500
MITCHELL DAM 67,500
MARTIN DAM 97,500
NORTH AUBURN 10,000
L-18 1,500
DEMOPOLIS 7,500
MERIDIAN 6,000 3,000
CUBA 1,500
SELMA 4,500
STONEWALL 4,500
UNION SPRINGS 4,500
LAUREL 6,000
HATTIESBURG 6,000 3,000
NEWTON 10,000
FLOMATON 1,500
MOBILE 18,000 10,000
PENSACOLA 6,000 3,000
SSIPPI
ALABAMA
G E
PRIMARY SUBSTATIONS
ALABAMA, FLORIDA AND MISSISSIPPI
COMPLETE OR UNDER CONSTRUCTION.
JANUARY 15, 1927
TRANSFORMER AND CONDENSER CAPACITY SHOWN.

Fig. 34. Map of Primary Substations. Alabama Power Co.

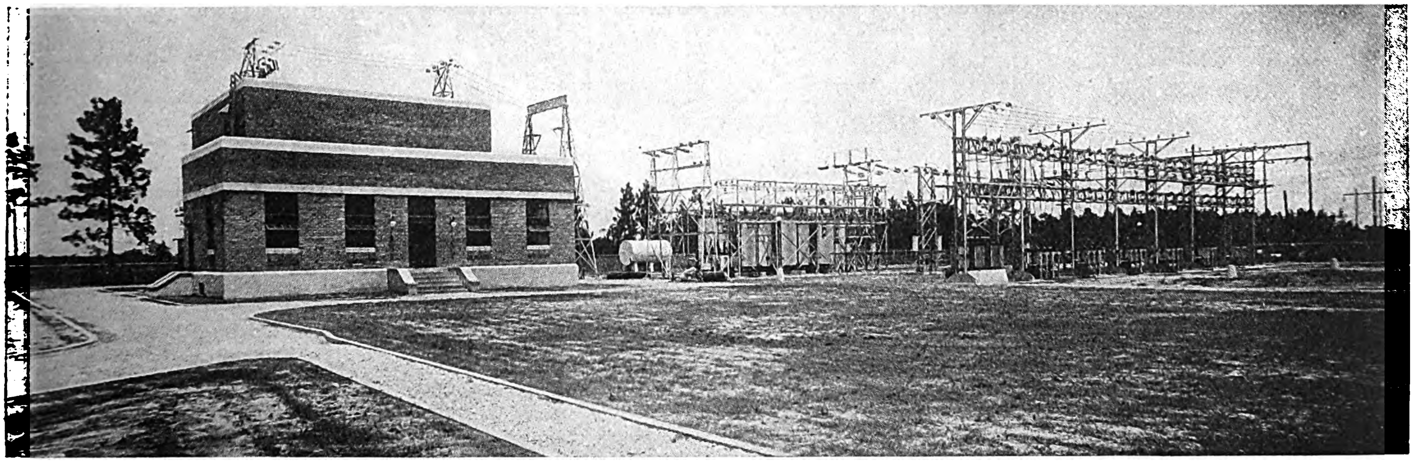


Fig. 35. General view Mobile Substation. Alabama Power Co. 18,000 *Kva.,* 110/22 *Kv.,* 10,000 *Kva., Synchronous Condenser* (11 *Kv.*), 4-22 *Kv. feeders*

TABLE I

Clearance Table—Primary Substations

VOLTAGE CLASS	Radius of Danger Zone around Live Parts	Minimum Vertical Clearance of Unguarded Live Parts	Minimum Horizontal Clearance of Unguarded Live Parts	Minimum Clearance from Live Parts to Guard
25001- 37000	12″	8′ 6″	4′ 0″	12″
37001- 50000	16″	8′ 10″	4′ 4″	16″
50001- 73000	22″	9′ 4″	4′ 10″	22″
73001- 88000	28″	9′ 10″	5′ 4″	28″
88001-110000	33″	10′ 3″	5′ 9″	33″
110001-132000	40″	10′ 10″	6′ 4″	40″
132001-154000	47″	11′ 5″	6′ 11″	47″
154001-187000	55″	12′ 1″	7′ 7″	55″
187001-220000	64″	12′ 10″	8′ 4″	64″

munication, and every substation of importance requires the cooperative effort of all five. Each of these sections have engineers who follow one or more jobs closely and who prepare specifications from which our design and drafting sections work. These engineers also send out inquiries for bids on equipment, analyze the bids and recommend purchase.

A new 110,000 volt substation costs anywhere from $100,000 to $400,000 depending on the amount and capacity of the equipment to be installed. Before any construction plans are prepared the engineer in charge of the job prepares a rather complete set of general specifications according to a standard outline. The use of these general specifications is three-fold; first, as a contract between the Engineering and Operating Departments that certain work will be performed, second, as a guide to the Designers for the preparation of plans, and third, as a guide in the checking of plans and the writing of the Working Specifications for the Construction Department.

The outline for these general specifications follows closely that used in the Standard Classification of Accounts for Primary Substations. For example, the outline we use starts in with the clearing of the substation site, then the grading and draining, the railroad siding, roads, fences, water supply, outdoor and indoor equipment, then buildings such as the switch-house, cottages, garages and pump house. Everything of importance that must be considered in

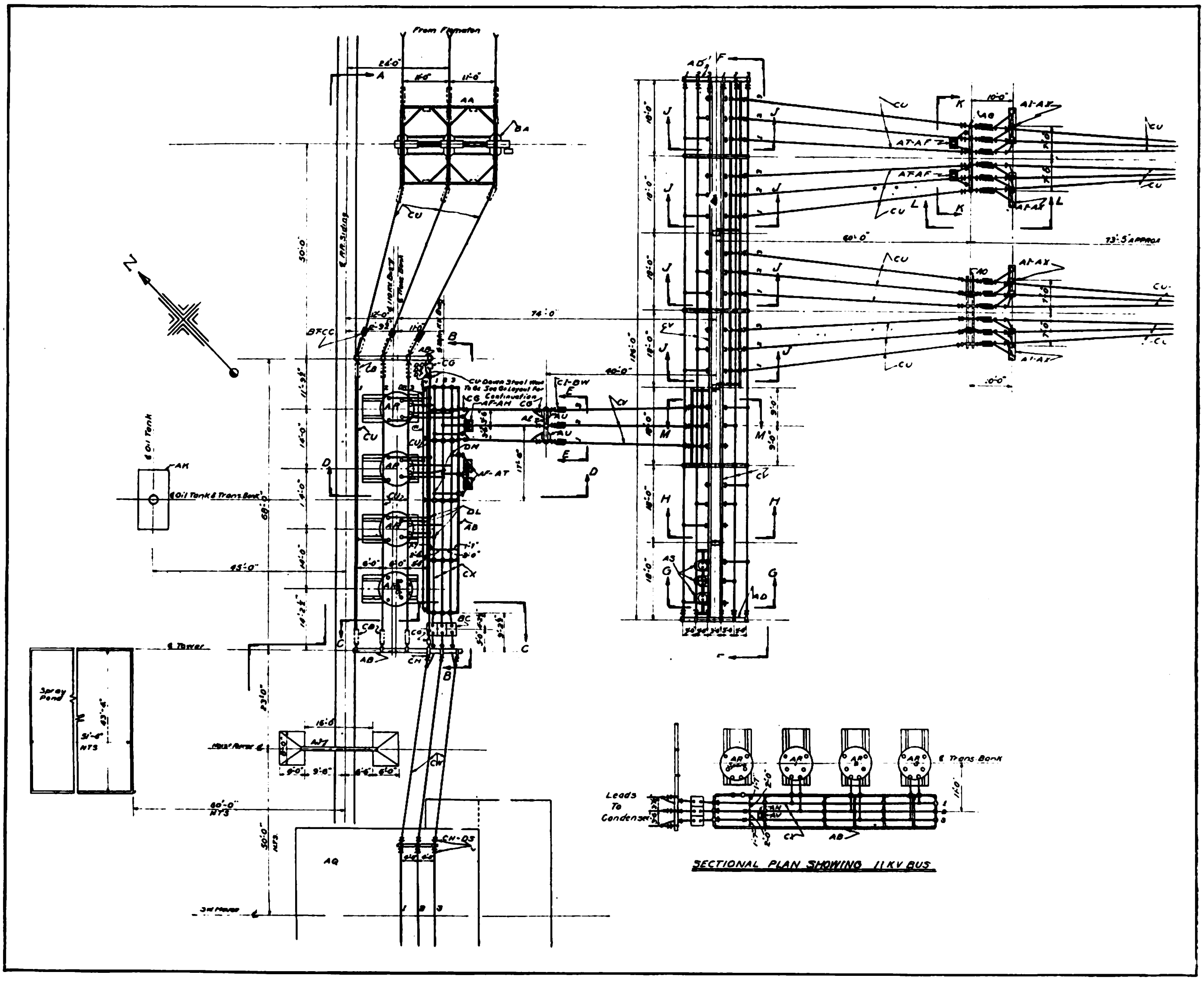


Fig. 36. Plan View—Mobile Substation. Alabama Power Co.

the station layout has some mention made of it. One advantage of this outline is that all the important features of the station are before the engineer for whatever thought and attention they deserve and there is no excuse of an oversight nor is there any excuse for

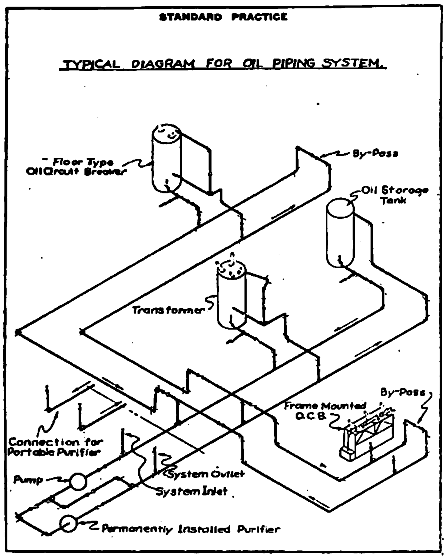

STANDARD PRACTICE
TYPICAL DIAGRAM FOR OIL PIPING SYSTEM.
Floor Type Oil Circuit Breaker
By-Pass
Oil Storage Tank
Transformer
By-Pass
Frame Mounted O.C.B.
Connection for Portable Purifier
Pump
System Outlet
System Inlet
Permanently Installed Purifier

Fig. 37. Typical Diagram for oil piping system. Alabama Power Co.

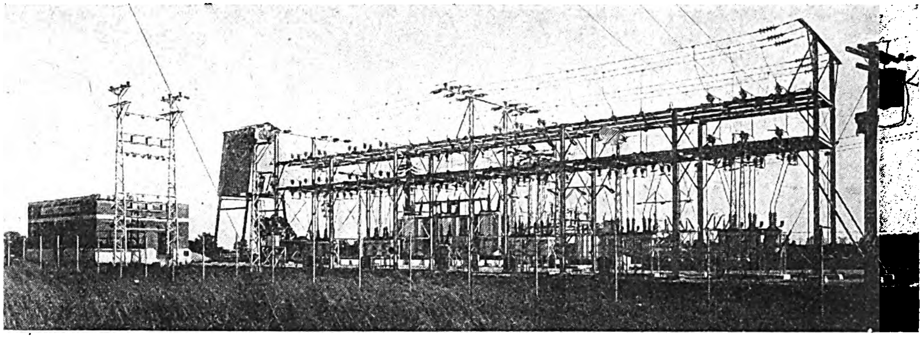


Fig. 38. General view Selma Substation. Alabama Power Co. 4,500 Kva.. 110/44 Kv., 4-44 Kv. feeders

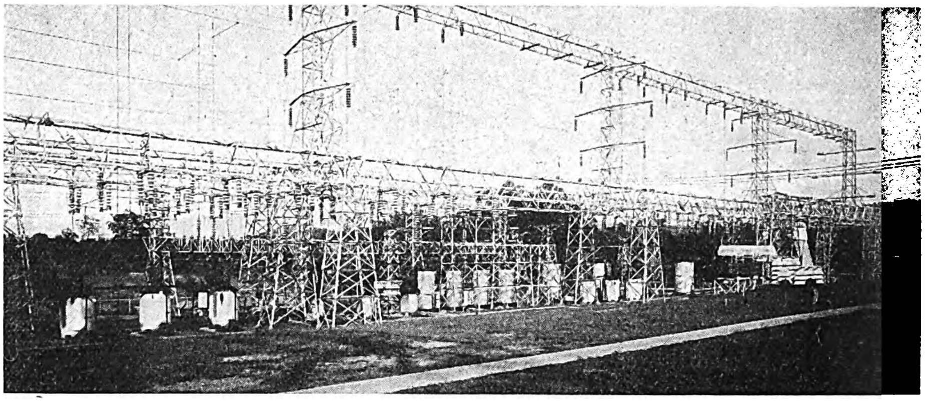


Fig. 39. General view Leeds Substation. Alabama Power Co. 13,500 Kva., 110/44 Kv., 12,500KVa., 13.2 Kv. Synchronous Condenser, 9-110 Kv. feeders. 3-44 Kv. feeders

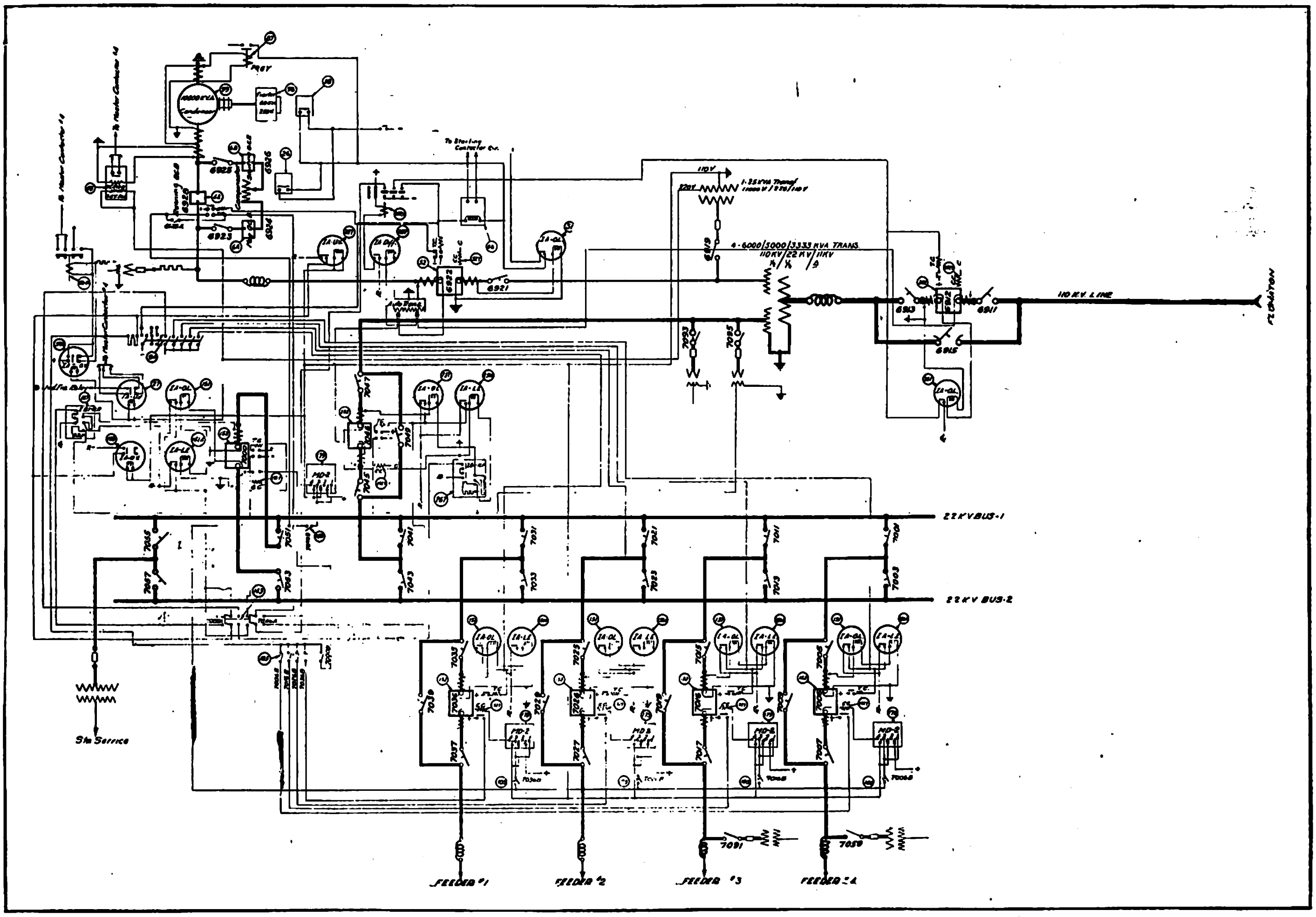

Condenser
110 V
4-6000/5000/3333 KVA TRANS. 110KV/22KV/11KV
110 KV. LINE
6911
6913
6915
22 KV BUS-1
22 KV BUS-2
Sta. Service
FEEDER #1
FEEDER #2
FEEDER #3
FEEDER #4
7091
7059

Fig. 40. Schematic relay diagram. Mobile Substation. Alabama Power Co.

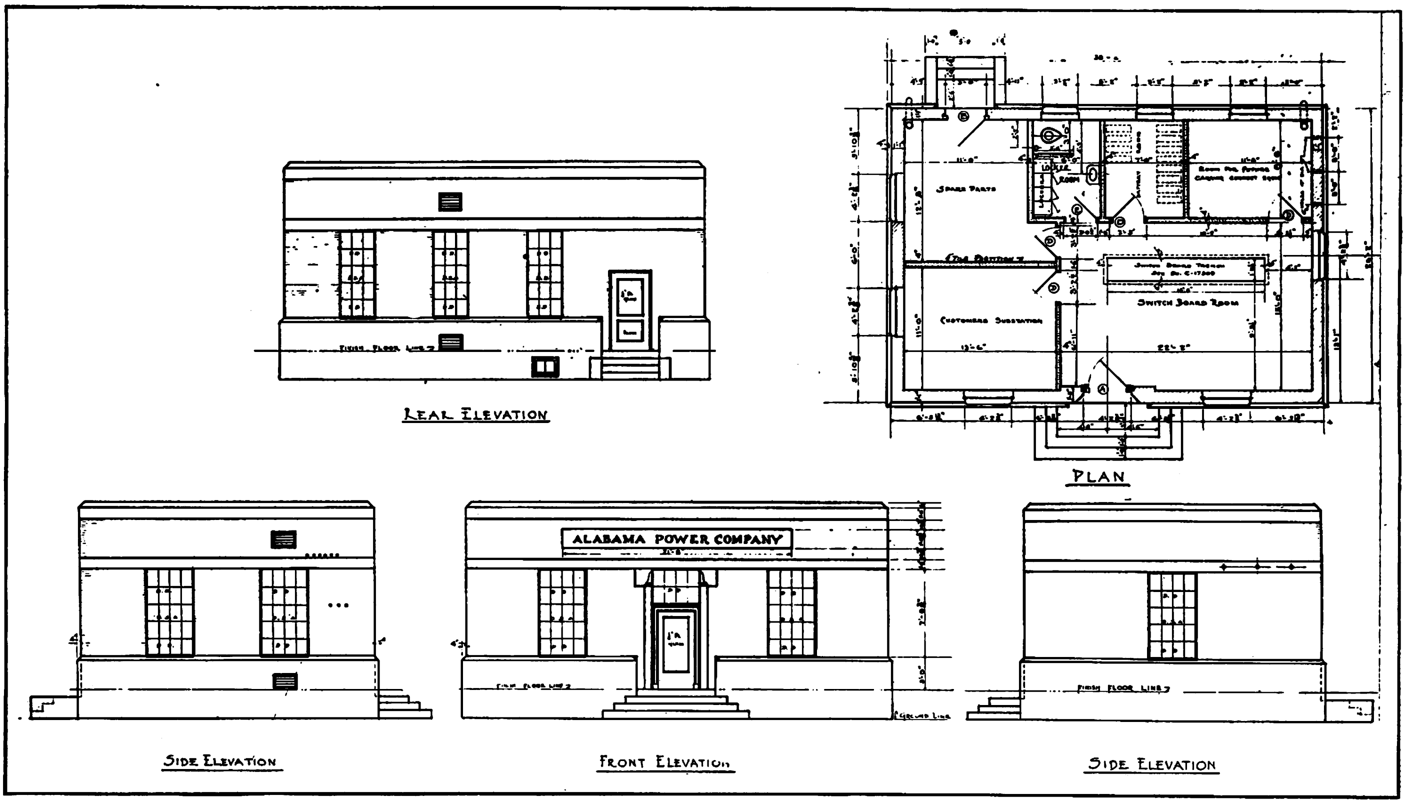

REAR ELEVATION
PLAN
Spare Parts
Customers Substation
Switch Board Room
SIDE ELEVATION
ALABAMA POWER COMPANY
FRONT ELEVATION
SIDE ELEVATION
Finish Floor Line
Ground Line

Fig. 41. Typical Substation building. Alabama Power Co.

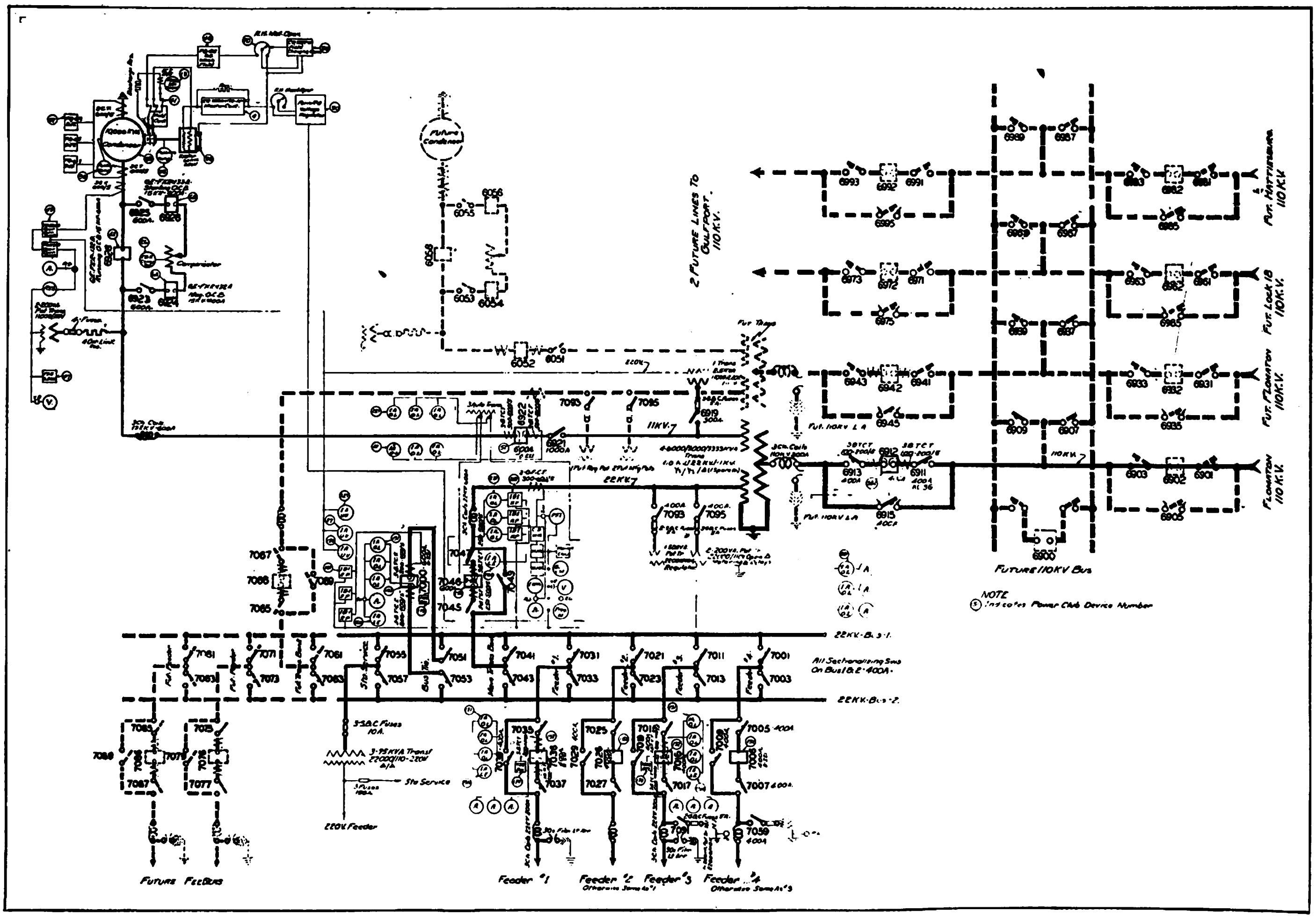

Future Condenser
2 Future Lines to Gulfport 110 K.V.
Fut. Hattiesburg 110 K.V.
Fut. Lock 18 110 K.V.
Fut. Flomaton 110 K.V.
Flomaton 110 K.V.
Future 110KV Bus
22KV-Bus-1
22KV-Bus-2
All Sectionalizing Sws On Bus 1 & 2 400A.
NOTE
(5) Indicates Power Club Device Number
22KV Feeder
Sta Service
Future Feeders
Feeder #1
Feeder #2
Feeder #3
Feeder #4

Fig. 42. Single line diagram. Mobile Substation. Alabama Power Co.

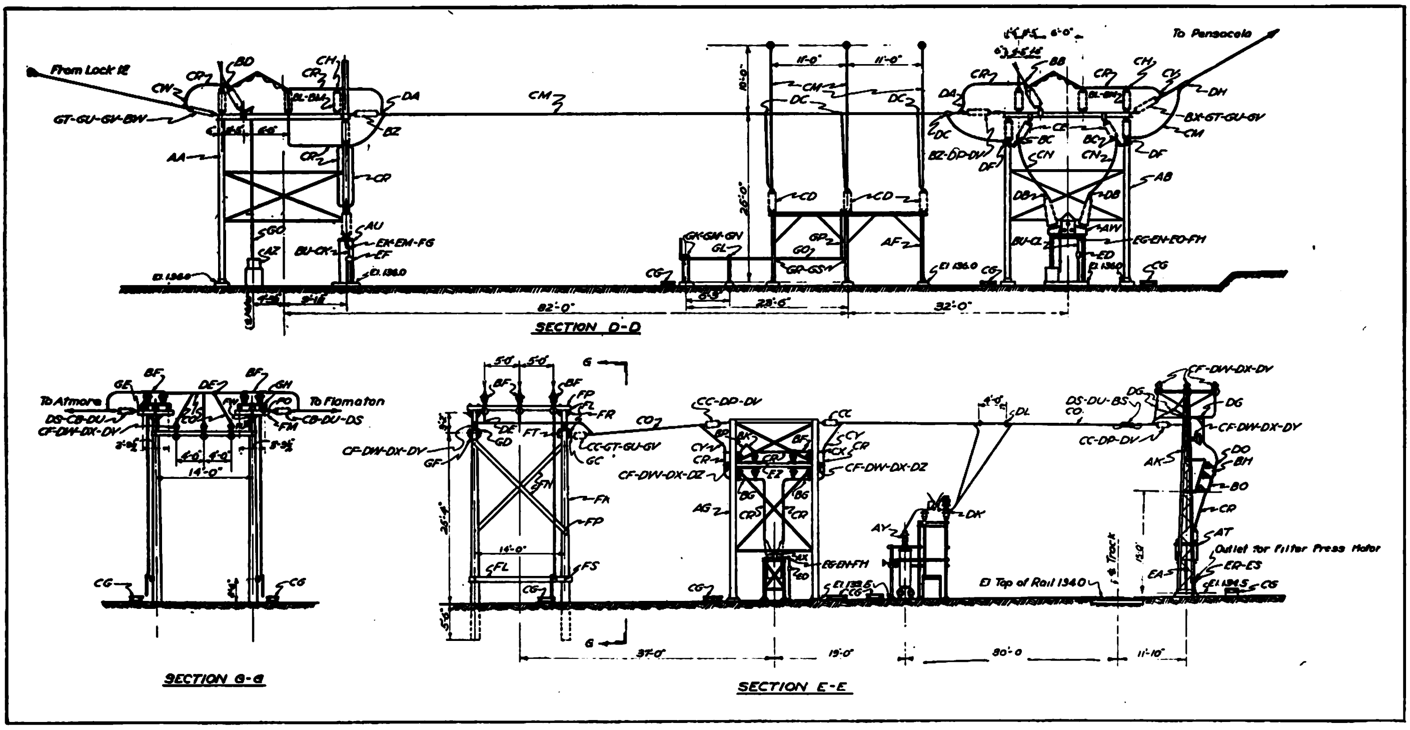

From Lock 12
To Pensacola
SECTION D-D
82'-0"
28'-6"
32'-0"
11'-0"
11'-0"
10'-0"
26'-0"
El. 136.0
CM
DC
CD
CR
DA
BZ
AA
GT-GU-GV-BW
BX-GT-GU-GV
EG-EN-EO-FH
EK-EM-FG
GK-GM-GN
GP
GO
GR-GS
AF
CG
SECTION G-G
To Atmore
To Flomaton
DS-CB-DU
CB-DU-DS
CF-DW-DX-DV
14'-0"
SECTION E-E
37'-0"
19'-0"
30'-0
11'-10"
5'-0
5'-0
CC-DP-DV
CC-GT-GU-GV
CF-DW-DX-DZ
DS-DU-BS
El Top of Rail 134.0
Outlet for Filter Press Motor
El. 134.5
G
G

Fig. 43. Sectional view. Flomaton Substation. Alabama Power Co.

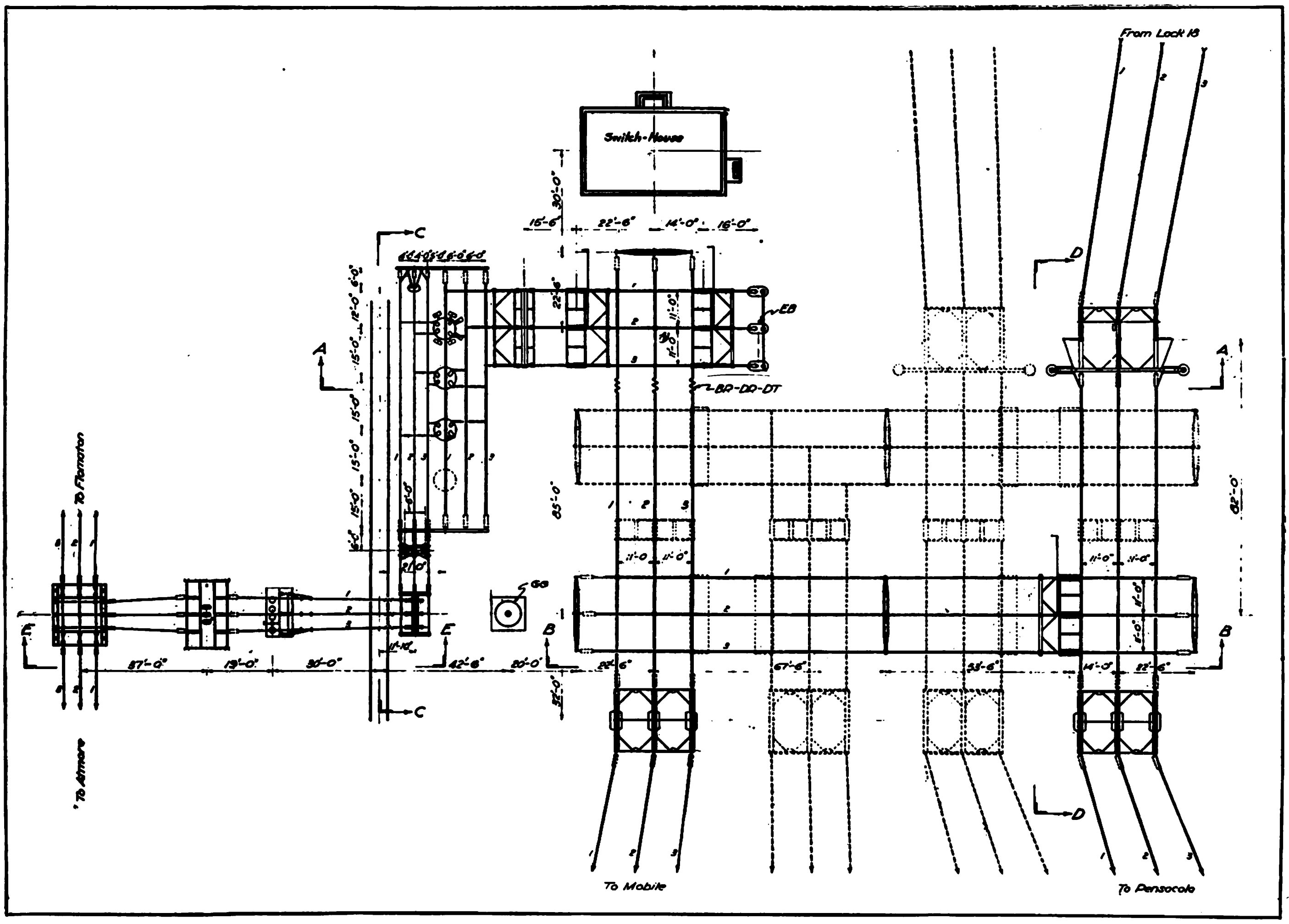

From Lock 18
Switch-House
To Flomaton
To Atmore
To Mobile
To Pensacola
A
A
B
B
C
C
D
D
E
E
EB
BR-DD-DT
GG
30'-0"
15'-6"
22'-6"
14'-0"
16'-0"
85'-0"
82'-0"
87'-0"
19'-0"
30'-0"
42'-6"
20'-0"
22'-6"
67'-6"
55'-6"
14'-0"
22'-6"
55'-0"
11'-0
11'-0"
11'-10"
1
2
3

Fig. 44. Plan view Flomaton Substation, Alabama Power Co.

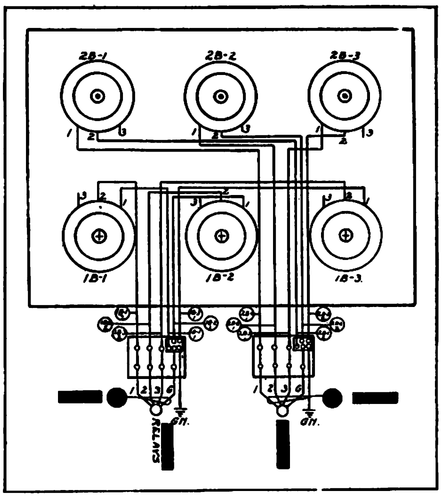

2B-1
2B-2
2B-3
1B-1
1B-2
1B-3
RELAYS
GN.

Fig. 46. Bushing type current transformer connection diagram. Alabama Power Co.

the designer misinterpreting the requirements. If, in the outline, some item is mentioned that does not apply at a given station that item is set down in the specifications with the statement that it does not apply.

Another advantage of the outline and the complete specifications it presupposes is in its benefit to the estimator. There need be little guess work on his part when his specifications are complete and they should be complete because curves of costs per kv.a. have practically no value in high tension substation work. Each station must have its own estimate and where that station is part of a project costing hundreds of thousands or perhaps several million dollars, the management does not want guesses or amounts taken off some set of curves.

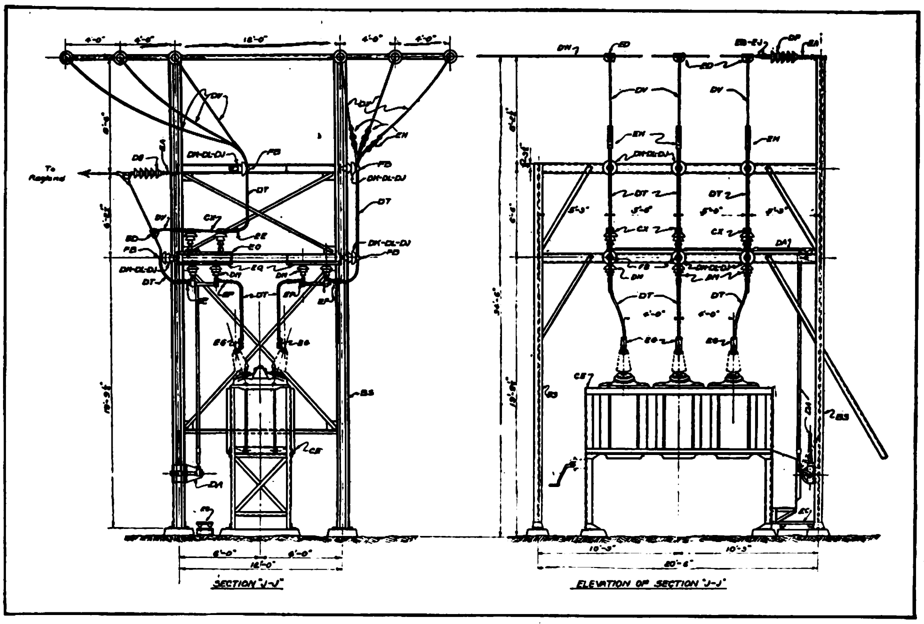

SECTION "J-J"
ELEVATION OF SECTION "J-J"

Fig 47. Typical 44 Kv. breaker arrangement. Alabama Power Co.

The cost of high tension substations on a far-flung transmission system is an appreciable figure in the overall cost to serve. Therefore, every economy that can be effected by careful engineering has to be made use of if many extensions are to be justified. Automatic equipment, standardized practices and rigid inspection point the way.

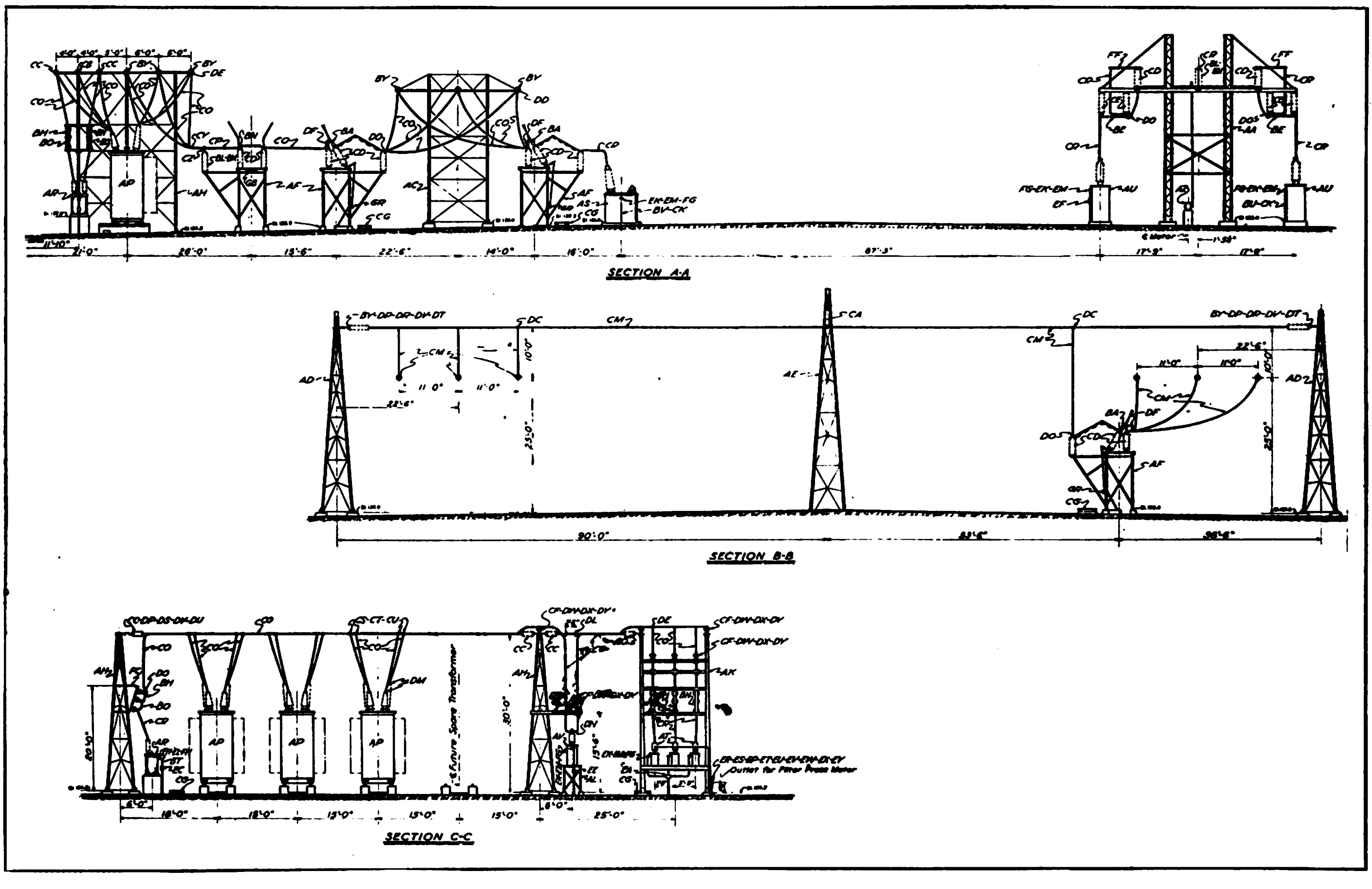

SECTION A-A
SECTION B-B
SECTION C-C
Future Spare Transformer
Outlet for Filter Press Motor

Fig. 45. Sectional plan. Flomaton Substation. Alabama Power Co.

Service Suggestions
NATIONAL ELECTRIC LIGHT ASSOCIATION — COMMERCIAL NATIONAL SECTION
CUSTOMER RELATIONS COMMITTEE
H. T. EAST, *Chairman*, Public Service Co. of Northern Illinois, Chicago, Ill.

To formulate efficient methods of conducting relations between the customer, the public and the supply company, including such matters as taking applications in the office, forms, order routing, inquiries, complaints, meter reading, collections and credits

No. 68 March, 1929

Records That Speed Service

By H. T. East

Public Service Company of Northern Illinois

RECORDS are necessary to the proper conduct of any business. Because of the nature of the utility business and the several phases of modern light and power company operation, the records required are many and varied in character. Those records which are identified with the individual customer and are often referred to in dealing with him are quite important from a customer relations standpoint. The purpose of this writing is to suggest some of the advantages which accrue when all information pertaining to the customer is consolidated on a single form. Since record keeping problems are dealt with by Accounting Section committees, the intention is to treat it herein solely from a customer relations point of view.

Because of the wide range of information which might be included on a customers' service record and the limited space available, there is a considerable difference of opinion as to what information properly belongs on such a record. The size of the company, company policies and methods of operation must be considered in arriving at a decision. Many different plans are in use.

System of San Antonio Company

Mr. Z. L. Pape, Superintendent, Application Department, San Antonio Public Service Company, San Antonio, Tex., describes a system employed by his company to speed up service to customers.

"The San Antonio Public Service Company," says Mr. Pape, "has approximately 98,000 meters in service. In the installation of new service, turning off or cutting in service, recording changes of occupancy, and other transactions affecting these meters, the application department handles more than three hundred orders each day. In the year 1928 over 92,000 such orders were handled.

"The volume of orders in this department had so increased that some new system for keeping a record of

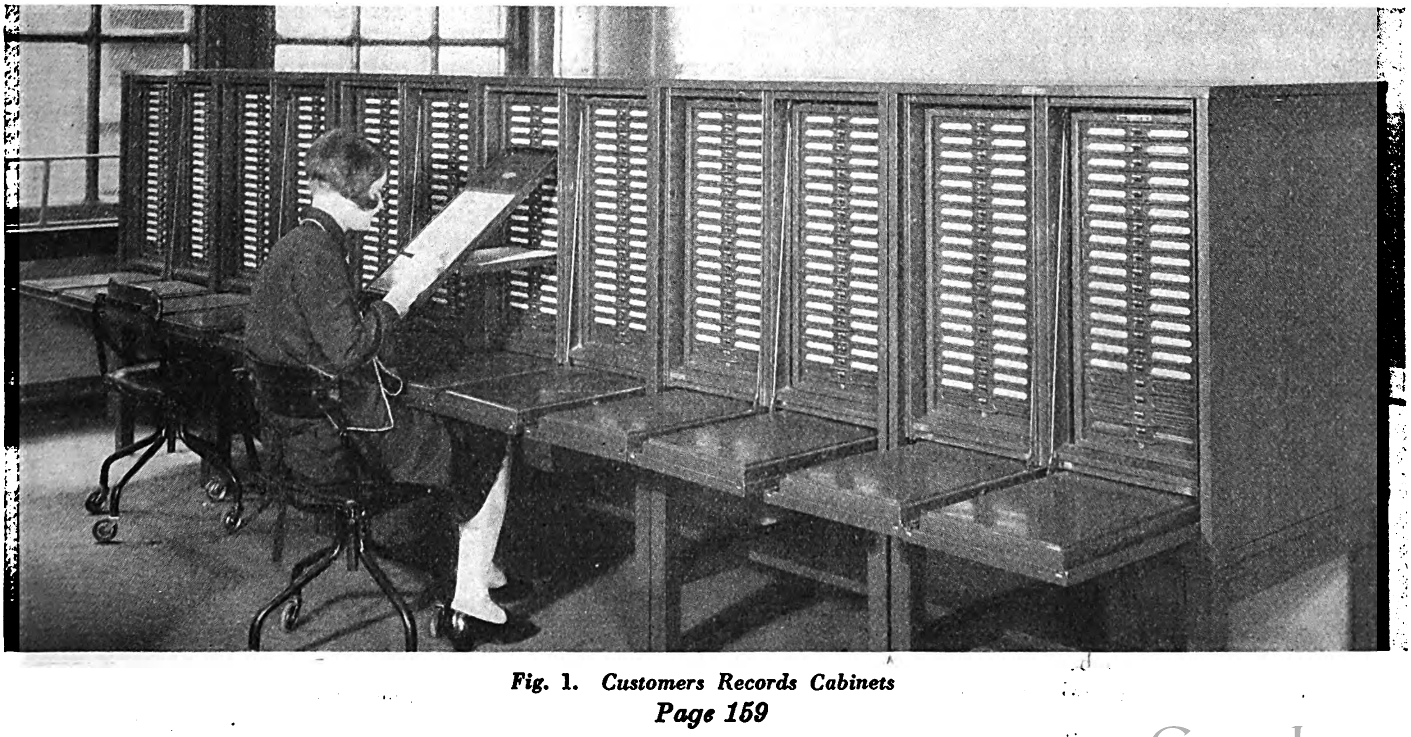
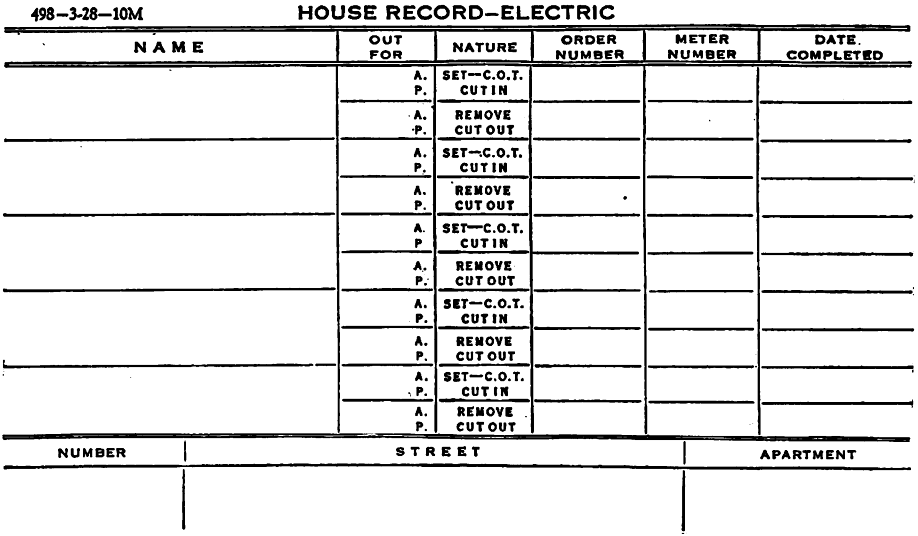


Fig. 1. Customers Records Cabinets



498—3-28—10M HOUSE RECORD—ELECTRIC

NAME	OUT FOR	NATURE	ORDER NUMBER	METER NUMBER	DATE COMPLETED
	A. P.	SET—C.O.T. CUT IN			
	A. P.	REMOVE CUT OUT			
	A. P.	SET—C.O.T. CUT IN			
	A. P.	REMOVE CUT OUT			
	A. P	SET—C.O.T. CUT IN			
	A. P.	REMOVE CUT OUT			
	A. P.	SET—C.O.T. CUT IN			
	A. P.	REMOVE CUT OUT			
	A. P.	SET—C.O.T. CUT IN			
	A. P.	REMOVE CUT OUT			

NUMBER	STREET	APARTMENT

Fig. 1. House Record Card. Actual size 3 x 5 inches. Special pocket holders are used to facilitate filing

all meters in service was found necessary. After considerable research and study the plan we now have was adopted and placed in use four years ago. As a result of the new arrangement, more than 92,000 orders and requests accepted last year were handled with a minimum of effort and confusion. Such a condition is highly desirable in the public utility business today.

Advantages of the Present System

"Our record system is simple, practical and economical. Following the initial equipment no additions are required except as the growth of the business demands. The record cards used are easily understood and provide an up-to-the-minute history of every installation on our lines. From them it can instantly be determined whether service is available at any address.

"This customer service record assists us in issuing orders to the operating department, by determining the nature of every order before it is transmitted, showing whether it is an old set, new set, turn on, turn off, or exchange of tenant; it eliminates 'call backs' and makes possible the execution of all orders by one crew instead of two, as was previously required. Since we operate a combination gas and electric company, it was formerly necessary to send a gas man and an electric man to every house where the customer ordered both gas and electricity. At the present time the electric metermen handle all turn-on, turn-off and change of tenant orders, both gas and electric. Thus it may be seen that a record such as this is both efficient and profitable in operation because it eliminates the necessity of two men calling at the same house.

Time Saving Arrangement

"Our visible house record is made up on cards filed in trays, each tray having a capacity of seventy-five cards. New trays and compartments can be added to the file as needed. Cards are filed alphabetically according to street and number. On this card is a complete record of all the work executed at that address for several years back.

"The filing cabinets are located near the application counter where they may be readily referred to. Below the card trays and integral with the equipment are steel shelves which may be pulled out and used when entries are made.

"The pockets into which the cards are inserted are constructed in such a manner that a card may be placed in either front or back. In this way provision is made for both gas and electric service records or the other card can be utilized for recording information of other character."

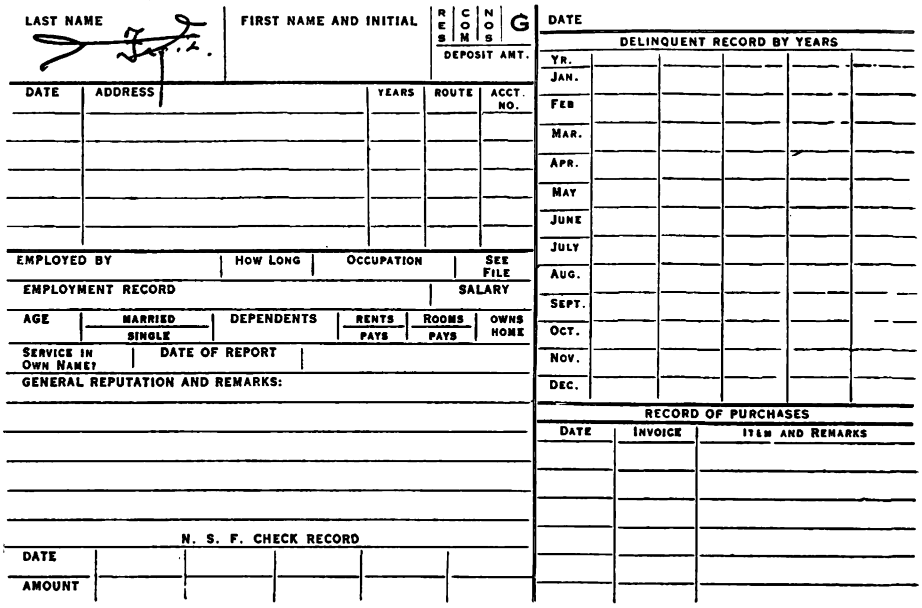
Other Customer Record Systems

In a majority of companies the records which pertain to the customer are kept by the several departments, each being concerned only with matters which it handles directly. When detailed information is desired concerning a certain customer, it is necessary to search through the files of several departments and collect the desired information. This lack of concentration is most keenly felt when a customer is waiting for information concerning his installation or account, since the delay involved is naturally greater than would be the case were all records combined on one form.

Although local conditions will largely dictate the type of record best suited to each situation, a plan of providing a customers' service record with space for entering thereon all pertinent information concerning the individual customer has much merit, and the adoption of such a system will prove useful in speeding up service to customers.

Customer Relations Value and Use

Considered from a customer relations point of view, customer service records of the kind outlined have much to recommend them. All information pertaining to the customer is concen-



LAST NAME	FIRST NAME AND INITIAL	RES	CON	NOS	G
		DEPOSIT AMT.			

DATE	ADDRESS	YEARS	ROUTE	ACCT. NO.

EMPLOYED BY | HOW LONG | OCCUPATION | SEE FILE

EMPLOYMENT RECORD | SALARY

AGE | MARRIED / SINGLE | DEPENDENTS | RENTS / PAYS | ROOMS / PAYS | OWNS HOME

SERVICE IN OWN NAME? | DATE OF REPORT

GENERAL REPUTATION AND REMARKS:

N. S. F. CHECK RECORD

DATE					
AMOUNT					

DATE

DELINQUENT RECORD BY YEARS

YR.					
JAN.					
FEB					
MAR.					
APR.					
MAY					
JUNE					
JULY					
AUG.					
SEPT.					
OCT.					
NOV.					
DEC.					

RECORD OF PURCHASES

DATE	INVOICE	ITEM AND REMARKS

Fig. 2. Credit Record Card. Actual size 4 x 6 inches

trated at one point. The facilities for quickly handling customer inquiries are greatly improved. Data on each address and each customer is made quickly available and a complete history of relations with each customer is provided. The time of customers who visit or telephone the company for information is saved and information is instantly available for the use of other departments when desired.

Conclusion

A unified customers' service record aids in promoting promptness and efficiency in serving customers. The experience of companies using such records indicates that the cost is justified by the results obtained. One objection which is frequently raised to the adoption of such a record is that it adds to the number of files which the company must provide and maintain. The facts are, however, that a well chosen customers' service record concentrating the work of filing and entering the number of separate records which the company maintains, the filing and recording expenses may be actually reduced.

Since records containing details concerning the customer and showing a history of his account greatly aid in controlling future contacts, they are of great value in customer relation work. A well planned customers' service record is desirable for utility companies, and the adoption of the idea will mutually benefit customers and employees as well as the company itself.

Service Suggestions serve their intended purpose only when the ideas and suggestions they carry are put to work. Many companies make it a point to provide all department heads with copies of each issue. Additional copies in leaflet form are available at a nominal price and may be ordered direct from the Chairman.

H. T. EAST, CHAIRMAN
1427 Edison Bldg., Chicago

What They Say About

THE ELECTRIC LIGHT AND POWER INDUSTRY IN THE UNITED STATES

A Handbook of the Electrical Industry Compiled by Public Speaking Committee, Public Relations National Section

The Georgia Power Company has thought well enough of this book to purchase sufficient copies to place them in the hands of all of our officials and department heads. We have also made them available to interested employees. Copies also have been supplied to a number of our larger customers, libraries and similar organizations outside the Company. We consider this worthwhile as a means toward educating our own employees and the public generally as to the true facts about the industry.

P. S. ARKWRIGHT,
GEORGIA POWER COMPANY

Two of our employee agencies for self-improvement are utilizing the handbook as text in their activities and making an intensive study by chapters. Others will similarly use the publication as a basis for study and expression.

C. W. DAVIS,
DALLAS POWER & LIGHT CO.

Although I have a very exhaustive file of lecture material upon which to draw, I find that the Speakers' Handbook is a valuable check upon this material for reliability, and it often gives me most helpful suggestions for the planning of public addresses.

L. D. GIBBS,
THE EDISON ELECTRIC ILLUMINATING CO. OF BOSTON

We have placed it in the hands of all our local managers with instructions that they use it as frequently as possible when seeking information about the electric light and power industry.

The Handbook is really an encyclopedia on the subject. It is well arranged and well written and in my estimation a book that could be used profitably by every electric power company in the country.

L. B. HERRINGTON,
KENTUCKY UTILITIES COMPANY

We have distributed the Speakers' Handbook to all of our officers, division and district managers and department heads. In addition we are using this booklet as a text book in all employees' educational meetings.

G. C. NEFF,
WISCONSIN POWER & LIGHT COMPANY

We have used copies of the Speakers' Handbook ever since the first ones were published and have found them invaluable in our public speaking activities. We were so pleased with the last copy that we ordered a sufficient number to place at least one in each of our offices. In some cases more than one was sent to each manager.

Not only is this book used for public speaking, but we have found it of considerable value in reference work. We have turned to it many times for information and have found it at all times containing something of value.

A. E. SCOTT,
INTERSTATE PUBLIC SERVICE COMPANY

We distributed 200 copies of the handbook, "The Electric Light and Power Industry in the United States," to employees of our Company, as we feel that the information contained in it is of unusual value to employees of a utility company.

We are confident that the handbook has been studied carefully by most of our people who received it, as from time to time reference is made to sections of it, especially during meetings of our employees and where papers are being prepared on the utility industry.

J. PAUL CLAYTON,
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY

Paper Binding,	1 to 25 copies	$1.00 each
	26 to 100 copies	.90 each
	101 to 500 copies	.85 each
	501 or more	.75 each

National Electric Light Association
420 Lexington Avenue, New York, N. Y.

INTERPRETATIONS of ELECTRICAL DEVELOPMENT

BY STATISTICAL RESEARCH DEPARTMENT, N.E.L.A.

H. A. SNOW, *Chairman, Statistical Committee, Accounting National Section*
H. S. BENNION, *Director of Engineering, N. E. L. A. Headquarters*
WM. M. CARPENTER, *Research Statistician*
MERLE RAINEY, *Assistant Statistician*

The Statistical Research Department of the National Electric Light Association will issue monthly, in this section, basic statistical information on the electric light and power industry.

The Department regularly receives comprehensive annual and monthly reports from the larger member companies of the Association, whose total business represents 80 per cent of that of all electric light and power enterprises in the United States. In addition, the Department consults and cooperates with other sources of information. Statistical research and analyses are continually in progress. The Department's bulletins will be authoritative.

Member companies are invited to make the fullest use of the statistical bulletins of this Department, published separately, as well as of the current statistical information in the N.E.L.A. BULLETIN, and to more fully utilize the services of the Department.

Monthly National Statistics of the Electric Light and Power Industry

The data here presented are for the total (100 per cent) electric light and power industry and are based on monthly reports received from some 380 companies, representing about 80 per cent of the industry.

	1928	(See Note)	Percent Increase
NOVEMBER 1928 (final figures)			
Data for the Month of November			
*Kw-hr. generated plus kw-hr. received from other sources	7,505,280,000‡	....	....
Sales of Energy (K. W. H. sold)			
Farm Service	53,249,000†	....	....
Domestic Service	831,012,000	....	....
Commercial Service			
Small light and power	1,082,860,000	....	....
Large light and power	3,627,453,000	....	....
Railways and railroads (motive power)	427,109,000	....	....
Other sales to ultimate consumers	188,597,000	....	....
Total sales to ultimate consumers	6,210,280,000	....	....
Total revenue (including approximately $9,000,000 from sales of resale energy and miscellaneous revenue)	176,955,000	....	....
Data as of November 30th			
*Generating capacity (kilowatts)	Not yet available		
Total number of all customers	23,155,000	....	....
Number of farms served (Wired homes)	130,720†	....	....
Number of domestic customers served (Wired homes)	18,918,000	....	....
Data for Twelve Months Ending			
*Kw-hr. generated plus kw-hr. received from other sources			
% generated by water power	Not available until December, 1928, report forms are completely returned and summarized		
Lbs. coal per kw-hr			
Domestic service (residential use)			
Average annual consumption (kw-hr.)			
Average price per kw-hr			
Preliminary Data for Month of			
Monthly			
Kw-hr. generated plus kw-hr. received from other sources	See *Note*		
Generating capacity (kw-hr.)			
Total number of customers			

*By courtesy of U. S. Geological Survey with deductions for plants not considered electric light and power enterprises.
†As reported by 110 companies only.
‡Includes a small amount of energy generated for use in electric and other departments of companies.
Note: Comparable data for the corresponding month of the preceding year will not be available until the January, 1929, report forms have been received and summarized.

Percentage of Farms With Electric Service

THE Association is now receiving sufficient data regarding farm service to make possible an estimate of the number of farms being served by the electric light and power industry by States. These farm statistics, although difficult to obtain, are in very great demand and it is hoped that all companies reporting regularly to the National Electric Light Association will make arrangements so that these data can be obtained for all States.

The information is being summarized and an estimate made as quickly as the State information is received. The table at top of next column shows the farm service for a few States for which a good coverage was obtained.

Farms Served on December 31, 1928

State	As Reported to N.E.L.A.	Estimated Farms Served	Number of ALL Farms	Per Cent Served
Wisconsin	11,630	18,000	193,155	9.1
Illinois	11,896	14,000	225,601	6.2
Michigan	11,081	14,000	192,327	7.0
Maine	5,966	8,400	50,033	16.8
Texas	4,752	8,000	465,646	1.7
Minnesota	3,538	6,400	188,231	3.4
Nebraska	1,344	2,700	127,734	2.1
Oklahoma	1,152	2,000	197,218	1.0
Louisiana	1,047	1,300	132,450	1.0

Source of Information

The number of farms served as estimated by the N.E.L.A. Statistical Research Department are based upon the returns from companies reporting in these States. The total number of all farms is taken from the Census of Agriculture for the year 1925.

The cooperation of all reporting companies will make it possible to complete this list so that it will cover all States.

Method Employed for the Setting up of Farm Service Records.

In order to make available to reporting companies methods employed in setting up the necessary records for the reporting of the item of farm service, six of the companies who have recently begun reporting this item have been asked to give us the method which they employed.

Mr. Harry A. Snow, Assistant Controller of the Detroit Edison Company, reports the method of that company as follows:

> "The Detroit Edison Company has no rate schedule applying particularly to farm service; farm customers are served under the regular residence rate or under one of the power rates.
>
> "To secure a segregation of earnings, sales, and customers for farm service, the Company had its meter readers place a check mark on the meter reading slip whenever they found that a customer whose meter they read qualified as a farm customer under the Census Bureau definition. The information conveyed by the check marks was transferred to the meter reading ledgers, each ledger sheet for a farm account bearing a special farm symbol.
>
> "In summarizing the earnings from each class of service, a special class was made for the sheets bearing the farm service symbol."

The definition of a farm as defined by the U. S. Bureau of Census is:

> "A farm is any tract of land of three or more acres used mainly to produce agricultural products, or any place of three acres or less, where the owner or tenant devotes his entire time thereon to agriculture."
>
> NOTE: Poultry and game raising, floriculture and horticulture and similar pursuits fall within this classification.

Developed Water Power of the United States

THE United States Geological Survey has recently made public its annual compilation of the developed water power of the United States, as of the first of the current year. In its summary, the Survey states:

"The total capacity of water wheels installed in water-power plants of 100 hp. or more in the United States on Jan. 1, 1929, was 13,571,530 hp., an increase of 1,275,530 hp., or 10.4 per cent, during 1928. The increase in 1927 was only 575,000 hp. The gain in 1928 was, therefore, more than twice that during 1927.

"Water-power development is apparently proceeding without being handicapped by the keener competition caused by the remarkable advance in the efficiency of fuel-burning plants since 1919. It is probably true that the time may not be far distant when the construction of water-power plants will be restricted by the advantages of modern steam plants, but the increase in the developed water power in recent years apparently indicates that this time has not yet arrived." *

The accompanying table sets up a comparison between the total horsepower in service in each State on Jan. 1, 1929, and on the same date a year before. During the year the total water power developed in the United States increased by 1,275,530 hp. Of this net growth, the equipment in public utilities and municipal plants increased by 1,347,955 hp., while that installed in manufacturing plants declined by 72,425, this decrease being largely accounted for by various mills which ceased to function as industrial enterprises and became public utility power plants.

Interesting comparisons are afforded by a study of the details of the increases in total capacity in the various States. Maine, for instance, has remained practically stationary in spite of the Fernald law designed to encourage the development and use of water power at home. Maryland shows the largest increase, largely accounted for by the completion of the Conowingo project. North Carolina, Alabama, and California show extraordinary growth in hydro-electric developments. In some of the States the installation of water power has actually declined, largely as the result of the abandonment of numerous small, isolated plants and their replacement by service from widespread interconnected systems.

Water Power Developed in the United States During 1928

(Plants of 100 horsepower or more, as reported by the U. S. Geological Survey)

Division and State	Total Jan. 1, 1929		Total Jan. 1, 1928	Developed During Year	Public Utility and Municipal Jan. 1, 1929		Manufacturing and Miscellaneous Jan. 1, 1929	
	No. of Plants	Capacity in H. P.	Capacity in H. P.	H. P.	No. of Plants	Capacity in H. P.	No. of Plants	Capacity in H. P.
United States	3,375	13,571,530	12,296,000	1,275,530	1,605	11,886,336	1,770	1,685,194
New England	1,203	1,653,654	1,556,062	97,592	262	879,914	941	773,740
Middle Atlantic	592	2,122,999	2,077,820	45,179	243	1,854,008	349	268,991
East North Central	390	1,075,660	1,036,785	38,875	265	841,435	125	234,225
West North Central	202	555,049	541,627	13,422	152	442,786	50	112,263
South Atlantic	338	2,595,304	1,967,250	628,054	173	2,444,992	165	150,312
East South Central	52	1,118,765	966,103	152,662	40	1,116,081	12	2,684
West South Central	34	47,082	44,432	2,650	23	43,577	11	3,505
Mountain	248	1,140,108	1,117,668	22,440	197	1,117,820	51	22,288
Pacific	316	3,262,909	2,988,261	274,648	250	3,145,723	66	117,186
New England:								
Maine	253	538,761	537,161	1,600	79	239,801	174	298,960
New Hampshire	244	278,002	278,002	....	62	143,711	182	134,291
Vermont	197	260,157	200,157	60,000	67	216,501	130	43,656
Massachusetts	325	362,123	362,123	....	28	159,211	297	202,912
Rhode Island	59	30,188	30,188	....	5	3,285	54	26,903
Connecticut	125	184,423	148,423	36,000	21	117,405	104	67,018
Middle Atlantic:								
New York	508	1,813,501	1,779,322	34,179	190	1,559,695	318	253,806
New Jersey	34	18,902	18,902	....	10	8,658	24	10,244
Pennsylvania	50	290,596	279,596	11,000	43	285,655	7	4,941
East North Central:								
Ohio	24	30,320	30,320	....	16	25,236	8	5,084
Indiana	26	56,521	56,521	....	17	50,620	9	5,901
Illinois	31	93,772	94,202	dec'r 430	16	76,797	15	16,975
Michigan	134	378,315	378,267	48	113	319,884	21	58,431
Wisconsin	175	516,732	477,475	39,257	103	368,898	72	147,834
West North Central:								
Minnesota	73	292,649	276,494	16,155	49	198,327	24	94,322
Iowa	46	182,139	183,908	dec'r 1,769	39	181,012	7	1,127
Missouri	7	20,560	20,560	....	5	20,260	2	300
North Dakota	1	245	245	....	.....	....	1	245
South Dakota	9	19,671	19,671	....	5	7,050	4	12,621
Nebraska	45	23,649	23,835	dec'r 186	41	22,954	4	695
Kansas	21	16,136	16,914	dec'r 778	13	13,183	8	2,953
South Atlantic:								
Delaware	3	1,161	1,161	....	.....	....	3	1,161
Maryland	16	415,815	37,815	378,000	5	411,765	11	4,050
District of Columbia	3	5,870	5,870	....	1	4,520	2	1,350
Virginia	63	140,239	141,471	dec'r 1,232	33	98,625	30	41,614
West Virginia	12	91,279	91,279	....	7	81,174	5	10,105
North Carolina	120	814,000	643,768	170,232	50	775,000	70	39,000
South Carolina	60	574,000	574,478	dec'r 478	33	546,000	27	28,000
Georgia	58	543,685	463,453	80,232	41	518,653	17	25,032
Florida	3	9,255	7,955	1,300	3	9,255	.....	....
East South Central:								
Kentucky	7	142,255	142,255	....	4	141,351	3	904
Tennessee	31	177,425	177,425	....	24	176,170	7	1,255
Alabama	14	799,085	646,423	152,662	12	798,560	2	525
Mississippi	.....	....	....	....	.....	....	.....	....
West South Central:								
Arkansas	4	15,680	15,550	130	4	15,680	.....	....
Louisiana	.....	....	....	....	.....	....	.....	....
Oklahoma	4	1,948	1,948	....	4	1,948	.....	....
Texas	26	29,454	26,934	2,520	15	25,949	11	3,505
Mountain:								
Montana	31	393,440	377,540	15,900	29	391,500	2	1,940
Idaho	54	357,577	355,277	2,300	47	354,575	7	3,002
Wyoming	11	17,355	17,280	75	10	17,029	1	326
Colorado	57	98,016	94,816	3,200	28	84,281	29	13,735
New Mexico	6	1,510	1,510	....	5	1,285	1	225
Arizona	10	104,360	104,360	....	10	104,360	.....	....
Utah	69	154,200	153,435	765	59	151,440	10	2,760
Nevada	10	13,650	13,450	210	9	13,350	1	300
Pacific:								
Washington	74	747,407	706,622	40,785	68	704,275	6	43,132
Oregon	83	288,973	288,859	114	50	234,001	33	54,972
California	159	2,226,529	1,992,780	233,749	132	2,207,447	27	19,082
U. S. Jan. 1. 1928	3,397	12,296,000	....	....	1,600	10,538,381	1,797	1,757,619

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*Editor's note: In connection with the foregoing statement, account should be taken of the long time interval elapsing between the inauguration of plans and the final completion of large hydro-electric projects. Five years hence, the effect of steam competition should be much more pronounced.

Electrical Production in Canada

APPARENTLY small, isolated plants in Canada are being rapidly supplanted by large central generating stations and interconnected systems just as they are in the United States, according to a report published by the Dominion Bureau of Statistics with the authority of the Minister of Trade and Commerce. During the past five years the output of electric energy from central electric stations in Canada has almost doubled and during the past six years it has increased by 136 per cent. In 1928 the large stations, which report monthly and which produce over 99 per cent of the total of all stations, generated 15,899 million kilowatt hours. This was an increase of 11 per cent over the 1927 output and of 96 per cent over the 1923 output.

During 1928 the exports of electric energy to the United States amounted to 1,587,710,000 kilowatt hours, or approximately one tenth of the total production. This export included 454,156,000 kilowatt hours of off-peak power developed by the Niagara stations.

Practically all manufacturing industries in Canada are operating their machinery either partially or wholly by electricity, which is largely purchased from central electric stations. The data for 1926, which is the latest available, shows that 69 per cent of the power equipment in manufacturing industries other than central electric stations is electrical, or, in other words, the total rated horsepower of electric motors in Canadian manufacturing industries is 69 per cent of the total power used by these industries and 82 per cent of these motors are operated by power purchased from central electric stations.

Although many of the smaller industries use electric power exclusively, the automobile, cement, paper goods and printing and book binding industries were the large industries showing 100 per cent electric power. Several others, however, were above 85 per cent electrified. Electrical apparatus and supplies shows 97 per cent, brass and copper goods 96 per cent, rubber goods 94 per cent, railway rolling stock 91 per cent, machinery 80 per cent, printing and publishing 88 per cent, sugar refineries, hardware and tools, and shipbuilding and repairs all show 87 per cent and castings and forgings 86 per cent.

An Evaluation of "1928 Prosperity"

WHILE the preliminary figures of the demand for electric power during the year 1928 show a substantial increase over 1927, they indicate that the "normal increase in demand" is doing little more than holding its own, according to an economic analysis of the output of electrical energy made by the Statistical Research Department of the National Electric Light Association. Using the figures reported by the United States Geological Survey, it is apparent that while the growth of the use of electricity suggests considerable gains in industrial activity in some states, there has been a marked hesitancy in others and an actual recession in a few.

Preliminary figures gathered by the Survey show a total output of electricity for the year 1928, by all agencies which contribute to the public supply, of a little less than 88 billion kilowatt-hours. While this is an increase of approximately 7½ billion kilowatt-hours over 1927, or 9.5 per cent, it cannot be said to represent anything more than the normal growth of the light and power industry, to which might be added a slight—and irregularly distributed—increase in the activity of industry and trade in the United States.

Analyzed by the various economic divisions of the country, the individual rates of increase in the use of electric energy present several striking contrasts and emphasize the trends in business and industry which are taking place. Considered in the light of what has been designated as an "exuberant financial market" and "the boiler plate prosperity of 1928," these analyses are significant.

New England, as a whole with an increase of 8.6 per cent, falls but little short of the national average and reflects, in large measure, the recovery of industry in this section.

The *Middle Atlantic* States (with which there are here included Delaware and Maryland) show a growth of 8 per cent when taken as a unit. This growth would apparently have been considerably larger except for the condition of Pennsylvania bituminous coal mining and an apparent sluggishness of general industry when compared with its greater activity in the states immediately to the west.

The *Industrial Middle West* states of Ohio, Illinois and Michigan show large gains over the previous year. Michigan, in particular, reveals an increase in output of 15.2 per cent and reflects the comparatively greater activity in the automobile business. Even with the inclusion of Indiana, which fell somewhat below the average, the increase in this area was 11.4 in percentage and almost 2 billion in kilowatt-hours. It is interesting to observe that, in actual kilowatt-hours, the increase in the use of electricity in these four states was greater than that of all New England, the South and the South West combined. The fact emphasizes once more the obvious (but often overlooked) fact that the markets afforded by miscellaneous heavy manufacture constitute the prime factors in the growth of electric service.

The *Industrial South* (which here has been taken to include the Carolinas, Georgia, Alabama and Tennessee) shows an increase a trifle below the national average, which fact apparently reflects the efforts made towards the balancing of production and sales by the textile industry in a year which was somewhat difficult for this line of business activity, and which moderate rate of increase stands in strong contrast with the 25½ per cent growth reported by the Geological Survey or 1927 over 1926.

The *Southwest* (which here includes Mississippi, Arkansas, Louisiana, Oklahoma and Texas) shows an extraordinary and striking increase of 21.3 per cent when taken as a whole. It reflects, in large part, the great expansion of the oil industry and of the growth in agriculture and general manufacturing (with the consequent extension of electric service on a large scale) in Oklahoma and Texas.

The *North Middle West* (which in this analysis includes Wisconsin, Minnesota, the Dakotas, Iowa, Missouri, Nebraska and Kansas) shows only the moderate rate of 6.7 per cent increase over the previous year and appears to indicate a hesitancy in the expansion of trade, in particular in Iowa and Missouri.

The *Pacific Northwest* (which here includes Montana, Idaho, Utah, Oregon and Washington) shows a marked increase in the use of electric power, which is primarily a reflection of increased metallurgical activity combined with a considerable expansion of electric service and consistent progress in its diffusion to agriculture. Montana shows a growth of 16.1 per cent, which again emphasizes the pick-up in copper mining and railroad traffic during 1928.

Of the remaining states, Colorado shows an actual decrease under the previous year, due apparently to some hesitation in the specialized mining industry of this region, while Arizona indicates a large gain, which reflects conditions in copper mining, a very considerable extension of irrigation service, and an increase in general trade.

Percentage of Increase in Electrical Output Five Times Increase in Coal

THE steady improvement made by the public utilities of the country in the efficiency of generating electricity by steam is shown by the summary of the use of fuel recently released by the United States Geological Survey. In calling attention to the progressive reduction in the amount of coal necessary to produce a kilowatt-hour in the average power plant, the survey states:

> "Public-utility companies and their power-plant operators were again successful in increasing the efficiency in the utilization of fuels in the generation of electricity. The amount of electricity generated by the use of fuels in 1928 was 5.5 per cent more than in 1927. The amount of fuel consumed, however, was only 1.1 per cent more than in 1927. The increase in output was therefore five times as much as the increase in the amount of fuel consumed. The average rate of fuel consumption for the entire United States in 1927 was 1.84 pounds of coal per kilowatt-hour; in 1928 the rate was reduced to 1.76 pounds. In 1919 the average rate of coal consumption in generating electricity was 3.2 pounds per kilowatt-hour. The rate of 1.76 pounds for 1928 is therefore very close to half the 1919 rate.
>
> "If coal had been consumed by electric public utilities at the rate of 3.2 pounds per kilowatt-hour in 1928 the increase in fuel consumption would have been about 38,000,000 tons, representing about $150,000,000."

If the saving of 38,000,000 tons of coal during 1928 (which was the result of the use of 1.76 pounds per kilowatt-hour as against 3.2 pounds in 1919), had been accomplished through the replacement of coal by more water power, an additional total of 43,200,000,000 kilowatt-hours of hydro-electric energy would have been required over and above the 34,747,000,000 actually generated.

In other words, if fuel use had remained last year at the same efficiency as prevailed in 1919 and this saving in coal had been effected by installation of water power instead of steam, it would have been necessary to increase the capacity of the hydro-electric plants of the country by about 14,000,000 horsepower—to more than twice the present amount.

Even the comparatively small saving of 0.08 of a pound of coal (or about 1¼ ounces) per kilowatt-hour (as a result of the use of 1.76 pounds in 1928 as against 1.84 pounds in 1927) is equivalent to 2,120,000 tons during the year.

ENGINEERING SECTION

E. C. Stone, *Chairman* **H. S. Bennion, *Director of Engineering, N. E. L. A.***

Electrical Apparatus Committee Meeting

By E. E. George

THE Electrical Apparatus Committee met at Cleveland, Ohio, on January 9 and 10, with J. Allen Johnson, Chairman, presiding. Three general sessions were held with one-half day additional devoted to Subcommittee meetings. The average attendance was about 80. The following is a résumé of the topics discussed:

Circuit Breakers

Among the many subjects dealt with by the Substations Subcommittee (L. G. Smith, Chairman), oil circuit breakers received their share of attention from many angles. One manufacturer has made concessions with regard to the use of transformer oil in circuit breakers and further developments along this line are expected.

Two of the large manufacturers promised developments of an unusual nature at an early date in connection with faster operation of circuit breakers. The production of high speed, high duty circuit breakers at reasonable cost has been agitated by the Apparatus Committee for several years, and the manufacturers are apparently making every effort to develop suitable equipment of this character. A brief description of the development of the Deion air circuit breaker was presented by representatives of the Westinghouse Company, and a part of the Committee witnessed demonstrations of this circuit breaker at East Pittsburgh on January 12, following the meeting.

The procedure being followed with regard to special tests on circuit breakers by the operating companies was outlined. As the information obtained by these tests is confidential between the participating companies, it was thought inadvisable for the Apparatus Committee to sponsor this work and it is being handled by a special committee of the Engineering National Section.

There was considerable discussion with regard to the coordination of N.E.L.A. and A.E.I.C. activities with regard to standardization of oil circuit breakers. Various other organizations are recognized as having an interest, and the desirability of joint action was discussed. The main Committee passed a resolution authorizing the Chairman to take such official action as is necessary to coordinate these groups to the end that cooperative action may be established.

Power Transformers

The new proposed standards of the A.I.E.E. for operating power transformers on a temperature basis were approved by resolution of the main Committee, "as a suitable basis for obtaining operating experience." Present standards are for rating purposes only, and there has been for some time a demand from operating companies for operating standards. The general principle of operating by maximum observable temperature, rather than by temperature rise, was strongly endorsed by several speakers, temperature rise being recognized as a proper criterion for design and rating, but actual temperature should be the basis of operation. The new proposed standards will encourage more extended operation by temperature and provide a statistical basis upon which more perfect operating standards may be set up at some future date.

One company reported that it is buying practically all power transformers of a standard size, and with three windings. A description of its procedure in testing power transformers which have been in service for some time was also furnished by one company.

Constant Current Transformers

The proposed A.I.E.E. standards for constant current transformers were discussed. Several companies reported disastrous failures of constant current transformers on open circuit, or when lightly loaded. This was found to have been caused by very high core losses at light load which occasioned sludging of the oil due to high temperature. Many pole type constant current transformers were found to be sludged so badly that the coils could not move freely. Some companies are taking care of this by buying such transformers with taps, but if each transformer supplies two circuits, as is frequent practice, the loss of one circuit may cause trouble. It was suggested that companies test out their constant current transformers for core losses due to magnetic leakage, over a wide range of load.

One company pointed out that pole type constant current transformers must be erected perfectly level. The general design of constant current transformers was criticized on account of the noise, insufficient insulation of leads, lack of protection, etc. It was pointed out that present designs left much to be desired from a safety standpoint, on account of inadequate enclosure.

System Stability

Under the auspices of the Generating Stations Subcommittee (C. A. Harrington, Chairman) one session was devoted to a discussion of the relation of the generating station to system stability. This discussion was quite comprehensive, embracing all factors of the generating station which can influence system stability, including prime mover characteristics, governors, generator characteristics, transformer characteristics, excitation systems, circuit breakers, auxiliary devices, and operation.

One company pointed out the desirability of having governor pilot valves on water wheel driven machines marked with an indication of rated speed, no load position, in order that when such machines are floating as reserve generating capacity the governors can be so adjusted that the machines can start delivering power with a minimum loss of time in case of system disturbance, at the same time avoiding the necessity of supplying the unit losses from the turbine at extremely low efficiency.

One manufacturer stated that low reactions and high short circuit ratios on generators were very beneficial in improving stability, also that damper windings on water wheel machines are quite useful on line to ground faults. The double windings being used in very large turbo generators can be so connected to the system as to increase the stability very greatly without increasing short circuit current.

All companies agreed that very fast relaying of circuit breakers is highly desirable in improving stability, and that on some systems the present limits were in the relays. In companies which set most relays at 20 cycles or 1/3 of a second, there is not much possibility of further improvement until the operating time of oil circuit breakers is speeded up. One company reported that speeding up the clearing of faults from 1 second to 5/10 of a second increased by 65 per cent the load carrying capacity of their 110 kv. tie lines.

One point on which there was complete agreement was that there was need for a circuit breaker which would clear faults in less than 1/10 of a second, and of ground, differential, balanced, impedance, or other relay schemes which would be independent of normal load and which could, therefore, be set very fast. The new carrier current pilot scheme was mentioned as having possibilities in clearing faults rapidly.

The discussion on this subject was illuminating, and the Generating Stations Subcommittee is contemplating the issuance of a serial report on the general subject of "The Function of the Generating Station in System Control," which is intended to include discussion of both the stability and the voltage, load and reactive power control aspects of the problem.

General Generating and Substation Items

There was some discussion in regard to a standard procedure for testing lightning arresters, but no agreement was reached as the Committee seemed disposed to wait until the various field investigations of lightning now under way had revealed more information regarding the nature of lightning surges.

There was considerable discussion with regard to grounding of systems through resistors and reactors. Some of the companies' representatives in localities where load densities are moderate very definitely favored solid grounding.

Very satisfactory operation of arc rectifiers on 600-volt railway service was reported.

One company reported that they were extending the use of lead covered control cable on account of trouble in braid covered cable after a few years' service. The usual discussion of apparatus failures revealed trouble with oil circuit breakers continuing to predominate.

Installation Rules

Under the Utilization Subcommittee (L. B. Bonnett, Chairman), a Sub-group has studied the installation rules of a large number of operating companies and has drafted a model set of rules which covers in general the subjects regarded as important. These suggested model rules would be useful to companies considering revision or modification of their rules. The model rules do not go into great detail, but combine the best features of the rules of a large number of companies. It is hoped to have these rules in form for regular distribution at the March meeting.

Service Voltage Standardization

This subject is being agitated by the manufacturers partly on account of the general trend toward higher lamp voltages on all systems, and partly on account of the rapid development of three-phase, four-wire low voltage networks. Reports on both 115/119-volt and 120/208-volt networks were presented, which indicated little trouble except in isolated cases such as x-ray machines, elevator motors, etc. Such cases are easily corrected by auto-transformers at comparatively small cost. The voltage variation on networks in thirteen companies ranges from 1 to 3 volts each way. It was pointed out that the satisfactory operation of 115-volt lamps and appliances, and 220-volt motors on 120/208-volt networks was due to the good voltage regulation.

There was considerable discussion regarding the proper voltage for lamps. Curves were shown indicating that 10 per cent overvoltage resulted in 25 per cent of normal life and 5 per cent overvoltage in 50 per cent life. Reports were also received which showed that slightly under normal voltage resulted in extensive complaint about unsatisfactory performance of lamps and other household appliances, but that overvoltage resulted in few complaints and occasional compliments about speedy operation of vacuum cleaners, cooking appliances, etc. At present practically all lamps are sold in the 110 to 120-volt classes with a majority at 115 volts. By a negative, no response vote at the call of the Chairman, it was established that no representative present at the meeting had need for a 110-volt utilization standard on his system. One member reported 110 volts still in service, but slated for early elimination. There was some sentiment to the effect that 220 volts was a more economical voltage for lamps than 110 volts now that satisfactory high voltage lamps are being produced. This is particularly true where the appliance load is heavy. However, the general census of opinion seemed to favor the retention of the lower voltage for lamps, at least for the present. One of the manufacturers pointed out the great benefit which would result from the elimination of one of the present three recognized lamp and appliance voltages, since in that case the voltage spread necessary to provide for appliances would be very greatly reduced.

The Utilization Subcommittee is studying this problem and is expected to report progress at the Memphis meeting in March.

Motor Starting Currents

A Sub-group of the Utilization Subcommittee studying this problem, presented a resolution embodying a fundamental principle which it believed should govern the rules for starting currents. This resolution stated in substance that the permissible starting current should bear some relation to the magnitude of the installation in connection with which the motor was to be used. For instance, a customer having a large power service supplying 100 small motors should be allowed to start any motor across the line, but a small motor in a residential neighborhood might have to be started by resistance or increment starters in order to avoid causing flickering of lights. This resolution was adopted by the Committee.

Codes

The need was discussed for a complete overhauling of the National Electrical Code, to result in a much simplified code.

The opinion was expressed that power houses should not come under the provision of the National Electric Code, since they are not at all in the same class with residential and industrial installations which must be supervised in the interest of public safety.

General

At the request of the American Section of the International Electro-technical Commission, the Committee, by resolution, subscribed to the recommendation of the U. S. National Committee of the I.E.C., that no change be made in the present standard ambient temperature of 40 deg. C. for rating electrical equipment.

A report on "Uniform Records of Electrical Operation of Power Systems," prepared by the Electrical Apparatus Committee of the Southeastern Division and revised by a group under the Operating Practices Subcommittee, with the assistance of representatives of the A.I.E.E. Relay Subcommittee, was approved for publication as a serial report.

The desirability of studying the possibilities of railroad electrification within the service area of power systems was discussed.

A general feeling was expressed that companies requiring special equipment should be required to pay the extra cost of same, and that a large majority using standard equipment should benefit by reduced prices resulting from quantity production of standard items.

The Committee acknowledges with gratitude the hospitality and attentions of the Cleveland Electric Illuminating Company during the sessions of the Committee.

Reliable Time Delay Under Voltage Devices Now Available

FOR some years, certain industrial users of electricity as well as many central station engineers in contact with industrial applications, have recognized the opportunity for increasing service reliability in the great majority of industrial applications, through the use of a time delay device in connection with the conventional low voltage release which ordinarily forms a part of motor control equipments.

It is a well known fact that a momentary voltage dip on a power distribution circuit frequently results in shutting down all the motors on the circuit when they are equipped with control providing instantaneous under voltage protection. This necessitates restarting the motors after each voltage dip with resulting loss of time and in many cases, where continuity of operation is necessary, of material.

About two years ago at the instance of the Electrical Apparatus Committee, the principal makers of motor control equipment undertook the development of time delay devices for their equipments. These devices have passed through the experimental stage and for a year or more have been in regular production. One manufacturer reports that twenty-two hundred volt compensators are now regularly supplied with the time delay feature as standard equipment; this is also true of his automatic compensators. One manufacturer also reports that after January 1, 1929, compensators for motor currents of 150 amperes and larger will be standardized with the time delay feature. Another manufacturer lists the time delay device as an optional addition for all of the above equipment. Compensators for smaller motors and lower voltage motors, and magnetic control for full voltage starting can be equipped with time delay devices at an additional cost of from 5 per cent to 25 per cent, depending on the size and kind of equipment. Considering the motor and its associated starting equipment as a unit, the cost of the time delay feature is not usually a controlling factor. Taking for example a 25 hp., 440 volt motor, the time delay feature with magnetic control adds about 4 per cent and with hand compensator control about 7 per cent. The time delay under voltage release and the instantaneous release are interchangeable, so that compensators already installed can have the time delay feature added at reasonable cost.

Up to the present, the demand for the time delay under voltage release has been much smaller than was anticipated. Recent Committee discussion would indicate a lack of information among central station engineers and commercial representatives as to the present status of this device, and the opportunities for improved service through its intelligent exploitation. The Electrical Apparatus Committee having sponsored to some degree the development of this device, takes this means of bringing it to the further attention of the industry.

It is hoped that the manufacturers will find means of educating industrial users as to the merits of this device and contribute as far as they may to its more general adoption.

Prime Movers Committee Meeting

By Edwin B. Ricketts, *Chairman*

A TWO-DAY meeting of Prime Movers Committee was held in Pittsburgh on Feb. 4 and 5, with a total attendance of sixty.

Final reports were submitted by the following Subcommittees:

- Chemists
- Foreign Developments
- Condensers
- Power Station Betterment

Preliminary reports were submitted by the following Subcommittees:

- Boilers, Superheaters and Economizers
- Higher Steam Pressures and Temperatures
- Pulverized Fuel
- Stoker Equipment and Furnaces
- Turbines

The Chemists' report is a continuation of the work of publishing standardized test procedure for power plant chemists, particularly regarding the testing of turbine oil and feed water. It is hoped that such a standardization will increase the usefulness of comparative data from various stations.

There was considerable discussion on the question of hydrogen ion concentration and methods of preventing trouble by control of relative content of sulphate and carbonate in boiler water.

Foreign Developments

The Foreign Developments report sets forth a large amount of data on the development of central station practice in Europe, with statements from a number of designing and operating engineers from Sweden to Italy. It seems that there are a number of stations in Europe using steam temperatures approximately 100 deg. higher than in the United States. The use of pulverized fuel has increased in some sections where variations in kind of coal used are common, while on the other hand two new central stations in Italy and two in Germany have chosen the large under feed stoker as the means of burning bituminous coal.

The report contains a statement by Parsons Company on a new 25,000 kw., 3000 r.p.m. turbo generator in which the generator voltage is 33,000.

In discussing the Foreign Development report Mr. McFarland told of recent experiments at the Philo plant in Ohio on melting the ash from the stokers and obtaining ferro silicon which apparently was of satisfactory commercial purity with noticeable absence of phosphorous and sulphur. This subject is to be investigated further in the hope that this will prove a means of obtaining an income from the ashes and, incidentally, a load increase to supply energy to the necessary electric furnace which can, of course, be operated on the off-peak period or operated on secondary power subject to interruption in case the capacity is required for prime power sold elsewhehre.

Condensers

The Condenser Subcommittee report will give considerable data comparing the effects of water temperature, water velocity and cleaning upon the rate of heat transfer and the effect of air leakage on the depression of the condensate temperature.

Power Station Betterment

The Power Station Betterment report contains a description of changes made in four different plants which have resulted in increased capacity and economy. Last year this committee reported upon four methods of collecting data on operation and of using this data for the control of operating efficiency. This year the report covers changes in physical plant which require capital expenditure with resulting increase in either economy or capacity.

There was considerable discussion on the money value of automatic boiler control, with divided opinion and insufficient evidence to warrant definite conclusions.

Boilers, Superheaters and Economizers

The Boiler, Superheater and Economizer Subcommittee has arranged to obtain a large amount of operating data on a wide range of recent boiler installations. The 34,000 sq. ft. boilers in Long Beach No. 3 plant in California will be covered by operating records and also statements from several companies operating boilers at 1200 to 1400 lb. pressure.

The report will contain information on comparative exit flue gas temperature and superheat, on boilers changing from oil to gas fuel or vice versa.

New boilers to be installed at the Delray Station in Detroit and in the new 1400 lb. plants of Deepwater and Holland, will be covered by statements from the operating companies.

Higher Steam Pressures and Temperatures

The Subcommittee on Higher Steam Pressures and Temperatures will thoroughly cover the several new plants that are now or shortly will be using boilers with pressure above 1000 lb. Comparative capital costs of these higher pressure plants with 400 lb. plants will be shown by reports from the various companies which have decided upon the desirability of this higher pressure.

Mr. McFarland told the committee of the recent proposal of the General Electric Company to build what they call a "steeple compound type" turbo generator, wherein the high pressure turbine and generator are mounted above the generator of the low pressure unit, thus making a considerable saving in floor space and providing for short steam connections from the exhaust of the high pressure turbine to the inlet of the 400 lb. turbine.

Pulverized Fuel

The Pulverized Fuel Subcommittee proposes to publish in their final report, to be submitted in March, information on the power consumption and labor and maintenance costs of a wide range of pulverizing units handling different varieties of bituminous coal and of anthracite.

Turbines

The Turbine Subcommittee is obtaining the operating history of the newer machines, with particular reference to operating troubles. Discussion developed the fact that considerable trouble was still being experienced with broken blades and that the entire question of suitable blade material and design was indefinite. There also has been an extraordinary amount of trouble with throttle valves, which subject was discussed at some length in the round table discussion.

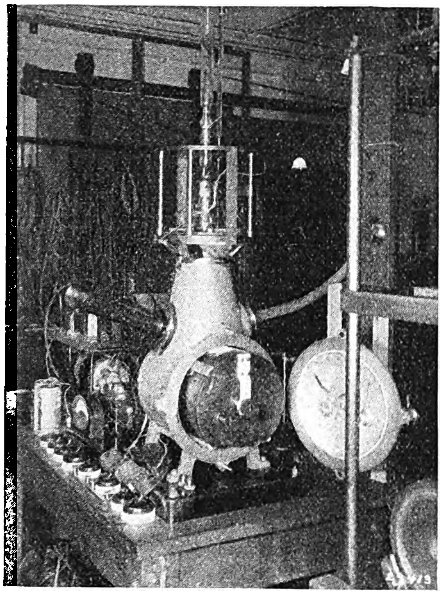
Professor White called attention to the fact that stainless steels with high chromium content should have a Brinell hardness of 225 to 250 and that several tests of blades which had given trouble showed this hardness to be down to 180 to 200. He suggested that possibly this might mean that the high superheat had gradually annealed the material, although it was pointed out that most of the trouble with blades had been in the low pressure stages where temperatures were not excessive.

The next meeting of the Prime Movers Committee will be in conjunction with the other Engineering National Section Committees in Memphis, Tenn., on March 13 and 14.

Progress of Joint Study of Telephone Protection —N. E. L. A. and Bell Telephone Systems

THE relation which telephone protection bears to the problems associated with inductive and safety coordination is under active study by the Development and Research Subcommittee of the Joint General Committee of the N. E. L. A. and the Bell System.

The scope of the project as laid out is wide and includes (1) a study of existing protective apparatus and methods, (2) the determination of the present and future requirements of telephone protection from the standpoint of lightning, induction, and contact, (3) possible modifications of existing apparatus and methods, and (4) the possible development of new types of apparatus or systems of protection.



Dufour Cathode Ray Oscillograph
Used by the Project Committee in Its Investigations of Protectors and Insulations
(This, the second Dufour Oscillograph in this country, is installed in the Bell Telephone Laboratories where all necessary auxiliary equipment is available for the various investigations.)

Tests of the operating characteristics and limitations of various types of telephone fuses have been carried out in high power laboratories. The operating characteristics of various discharge gaps have been determined with the aid of a Dufour cathode ray oscillograph which was obtained from abroad and was one of the earliest used in this country. This instrument is now being used in a study of the breakdown characteristics of various types of insulation used in the telephone plant.

An extensive study was made to determine the various types and combinations of telephone plant which require protection, together with the respective amounts and the expected frequency of occurrence of those types and combinations.

A survey of the types and kinds of power systems now in use was made to obtain, in so far as the protection problem might be affected, a representative cross-section of distribution and transmission practice. Opinion as to the characteristics of future transmission and distribution plant was also sought.

The more important investigations in which the committee is now actively engaged are as follows:

1. A determination of the dielectric characteristics of the telephone plant.
2. A study of the various klydonograph investigations to determine the value of voltage due to lightning to be expected on telephone plant and the propagation of such voltage.
3. A determination of ground potentials in the vicinity of power stations during times of fault on the power systems.
4. A study of fault conditions on power systems and their reaction on the telephone protection problem.
5. A collection and study of data on the field performance of telephone protection when lines are subjected to foreign voltage due to induction from or to contact with power circuits or to lightning.

What may be expected from the work of this committee is substantially as follows:

1. A mutual understanding of the features of the telephone and power systems which affect the protection of the telephone system.
2. Data on the operation and performance of present protective devices.
3. Information as to the importance of telephone protection in respect to inductive and safety coordination.
4. Conclusions as to the possibilities of developing improved protective methods and devices.

The personnel of the Project Committee now carrying on this work is as follows:

Bell System	*N. E. L. A.*
H. S. Warren, Chairman	R. N. Conwell, Chairman
R. K. Honaman	J. O'R. Coleman
O. B. Jacobs	R. D. Evans
D. H. Keyes	J. C. Martin
D. T. May	K. B. McEachron
J. H. Moore	William Shuler
A. H. Schirmer	S. A. Smith, Jr.

Annual Group Meetings of Engineering Section, New England Division, N. E. L. A.

By F. G. HARRIMAN

Vice-Chairman, Engineering Section, New England Division, N.E.L.A.

UNDER the auspices of the Engineering Section of the New England Division a very successful meeting attended by over 250 representatives of the electric utility and allied interests in New England was held at the Hotel Statler in Boston on February 13 and 14. Chairman C. A. Mayo of the Malden Electric Company presided.

The program included a luncheon and afternoon session followed by a banquet and evening session on February 13; and concluded with a morning session on February 14. A variety of subjects were ably presented by well-known and competent speakers, and the quality of the discussion which ensued after each paper indicated keen interest on the part of the delegates. The list of speakers and their subjects were as follows:

Address of Welcome by I. W. Day, President of the New England Division, N.E.L.A.
The Planning of a Utility System, by L. W. W. Morrow, Editor of *Electrical World.*
Operation of High Pressure Steam Electric Generating Stations, by R. Brown, Technical Assistant, Generating Department, The Edison Electric Illuminating Co. of Boston.
Pennsylvania Railroad Electrification, New York to Wilmington, Del., by E. R. Hill, of Gibbs & Hill, New York.
The Public Utility Situation in Maine, by J. E. Goodwin, Chief Engineer of the Maine Public Utilities Commission.
Fractional Horsepower Motors, by L. L. Elden, Technical Advisor to the General Superintendent, The Edison Electric Illuminating Co. of Boston.
Frequency Measurement and Control, by R. Brandt, Engineering Assistant, New England Power Association.
Moving Pictures showing the development of the electric locomotive and mercury arc rectifier.

High Pressure Steam Stations

The paper on high pressure steam stations by Mr. R. Brown dealt in a comprehensive way with the operating problems encountered in connection with the first 1200 pound boiler and turbine which was put in operation in the Edgar Station of the Edison Electric Illuminating Co. of Boston in December, 1925, and the later installations using 1400 pound pressures. It was pointed out that the troubles with this equipment were not greatly different or more serious than those experienced in normal pressure stations, and the availability factor in actual practice was remarkably good. As the cost per kw. of a properly designed high pressure station was stated to be no higher than for a normal pressure station, they feel that the increased efficiency from 1.02 pounds of coal per kw-h. output at normal pressure to 0.97 pounds at 40 per cent and the estimated 0.90 pounds at 100 per cent high pressure development is a clear saving.

Railroad Electrification

Mr. E. R. Hill's paper on railroad electrification traced the development of this important subject from the first electrified line in this country, which was the Nantasket Beach, Mass., branch of the New York, New Haven & Hartford Railroad in 1895, to the present day when about 3900 miles of track are electrified, with prospects of 5500 miles by 1935. The present project of the Pennsylvania Railroad involves the electrification of 1300 miles of track at a cost of 100 million dollars, and is the largest project to date in the world. The magnitude and importance of this project is indicated by the estimate that the ultimate development will have a demand of 250,000 kw. and will use 1,400,000,000 kw-h. per year at a load factor of 68 per cent. The plans contemplate purchasing the entire electrical requirements from public utility stations, which indicates the tremendous importance of this business to the industry. Lantern slides were shown illustrating different types of construction and equipment, and an active discussion of the advantages and limitations of railroad electrification followed.

Power Systems Committee

Mr. L. W. W. Morrow, well known as editor of the *Electrical World*, and recently appointed as the first chairman of the National Power Systems Engineering Committee, explained the purposes of this new committee and stressed the new position and obligations of the engineer with relation to the other branches of the industry. He appealed to engineers to be broadminded; "to bring our new knowledge of engineering science to the benefit and uplifting of mankind"; and in planning our systems to keep in mind all the factors of cost, expected growth, revenue and net balance.

Power in Maine

Mr. J. E. Goodwin's paper included much interesting data on the activities of the public utilities in Maine; such as the statement that 99 per cent of the energy generated in the state in 1927 was generated by hydro. It was pointed out that Maine's problems are different from the balance of New England due to the low density of its population, the figure for Connecticut, for example, being 316 persons per square mile, and for Maine only 24. Yet 78 per cent of the population and about 24 per cent of the farms are supplied with electric service.

Frequency Control and Measurement

The subject of frequency control and measurement was very thoroughly covered by Mr. Robert Brandt, who stressed the increasing importance of this subject due to the rapid expansion of interconnected systems. Such phases of the subject as the types of instruments available, the characteristics and limitations of governors, automatic versus manual frequency control and the requirements of an ideal automatic frequency controller were carefully presented. The magnitude of the problem even in New England is illustrated by the fact that nearly all of the large systems in this district are now interconnected, with a combined demand of nearly a million kw. The subject was discussed at length by a number of prominent engineers representing the leading manufacturers and utility companies.

Fractional Horsepower Motors

Mr. L. L. Elden, whose work in representing the interests of the utilities with the object of improving the characteristics of fractional horsepower motors has been nationally known for many years, outlined the growth in importance of this subject whose present proportions may be seen from the statement that four million such motors will be produced in 1929. A very important and encouraging announcement was made that at a conference held only last month between the appliance and motor manufacturers and utility interests, an agreement was reached with several large manufacturers that only motors meeting the new approved specifications will be used in the future. The desirability of the new type motor from the point of view of the electric company is at once evident from the fact that many split phase ¼ horsepower motors now in use have a starting current of 35 to 45 amperes, representing a momentary load up to 5 kilowatts, while the new specifications limit the starting current to 15 amperes, and some have actual starting currents of less than ten amperes. The discussion of this paper by several large motor manufacturers indicated that full cooperation may be expected from them in putting over this program.

Interest was maintained at a high pitch throughout the meetings, which were generally conceded to be the most successful of any held by the section in recent years.

North Central Engineering Meeting

At the third annual engineering conferences of the North Central Electric Association, held at Minneapolis, Minn., Jan. 21-22, E. C. Stone, Chairman of the Engineering National Section, stressed the expanding functions of engineers in electric utility progress and offered to them five definite recommendations. These were: they should seek to work out in practice the motto, "More system capacity per dollar of investment"; they should avail themselves of the valuable experience contained in serial reports; they should interest themselves in the regulatory code proposals now before the industry; they should analyze the performance characteristics of the systems they operate to the end that operating costs may be lowered; they should make critical analyses also of system design and construction in order that the wide variations in costs now existing may be narrowed.

Meet Dissatisfied Customers Half Way

Conscientious and persistent efforts to meet dissatisfied customers at least half way will prevent the greater part of the complaints made to State regulatory commissions E. H. Morris, chief engineer of the North Dakota Railroad Commission, told the convention. To back up his statement, Mr. Morris said that of the complaints received by the North Dakota commission, less than 5 per cent had any basis at all and only 2 per cent were justified.

Conspicuous success with the idea that is not new but has seemed more alluring than practical to many central-station merchandisers were recounted by C. J. Strike of the Northwest Public Service Company, Huron, S. D., in an address on "How Operating and Commercial Departments Can Coordinate Their Activities." Mr. Strike told interestingly how he persuaded operating men to consider themselves salesmen as well as meter readers, linemen and service men, and described how they achieved really surprising results.

That the average distance traveled by a kilowatt-hour from generator to consumer was between ten and twenty miles was one point made by H. S. Bennion of the N. E. L. A. headquarters staff in his address on "Interstate Power." The small amount of energy that crosses State lines emphasizes the essentially local characteristics of the power industry, he said, and leaves small argument for the suppression of State by Federal regulation or for superimposing the latter on the existing situation.

Stock Taking for the Engineer

Speaking at the conference banquet, L. W. W. Morrow, editor of the *Electrical World*, said that the time had now come for the engineer to take stock of what he was doing, to forsake the path of expedience that heretofore was the only road open to him and to consider the building of electrical systems with strict regard not only to the technical but to all the essential factors. Mr. Morrow gave an illuminating sketch of the work of the new Power System Engineering Committee, of which he is chairman. This committee will attempt to set up in logical and comprehensive fashion the factors that determine system design, so that central stations may develop their systems according to orderly and coherent programs fixed by operating conditions.

Group Discussions

A day of well-attended and interested group discussions kept the 219 engineers present at the conference occupied right up to the close. One subject that appeared to have invaded the deliberations of all of the committees, even the one on hydraulic power, was radio interference. This problem, judging from the animated discussion it provoked, is still far from a solution, particularly in regions distant from high-powered broadcasting stations where receivers must be operated at high sensitivity.

So many subjects of discussion were developed that it was decided to devote in future considerably more time to a "clearing house" of ideas, with more adequate provision for impromptu speakers, Secretary J. W. Lapham said. He told the opening session that the light and power companies of the Northwest spent nearly $12,000,000 for construction and replacements in 1928.

COMMERCIAL SECTION

Marshall E. Sampsell, *Chairman* **C. E. Greenwood**, *Commercial Director, N. E. L. A.*

Merchandising Bureau Meets at Detroit

THE four committees of the Merchandising Bureau of the Commercial National Section were in session at the Book-Cadillac Hotel, Detroit, on Feb. 5 and 6. Chairman F. D. Pembleton's schedule included committee meetings on the first day and executive meeting on the day following.

The minutes of the meetings of the committees show that practically every phase of power company merchandising practices and policies is receiving considerable attention.

The Range Committee, F. A. Coupal, Chairman, is developing a report bringing out the newer facts on desirability of range business, and the proposed chapters were discussed in detail. The Range Committee of the Northwest produced authoritative data in connection with the operating aspects of the range load, and this year's report will stress the selling aspects. Informative data which the report will contain will be of immeasurable value to commercial men interested in the promotion of domestic cooking.

The progress of the Water Heating report has been outlined in previous issues of the BULLETIN. Nation-wide interest has developed in the subject, and the committee under Chairman N. T. Wilcox is sponsoring an analysis of the class of business which is of outstanding value. The field work is being done under the direction of the Engineering Department at headquarters. Well-defined tests will be in progress over a term of months. The final report cannot be published previous to the convention this year.

C. L. Dunn, Chairman of the Refrigeration Committee, reported as a nation-wide activity an educational movement on the value of food preservation. The completed plan has been sent to the Executive Committee of the Commercial Section for indorsement.

The important phases of merchandising have been investigated and progress report made by Chairman C. L. Harold. This committee will produce a supplemental report on oil burners, emphasizing the marketing aspects.

The subject of substandard devices, so important at this time when inferior products are being sold to the public, has had most considerate attention and valuable test data has been obtained.

A subcommittee is making plans for the stimulation of sales of farm appliances. The opportunities in this field are fully realized, and the value of selling more electric equipment to rural customers for the common interest of the farmer and the utility.

An analysis of the radio situation in connection with the sale of radio sets by the power companies indicates that radio equipment has reached a state of sufficient commercial stability to justify active merchandising by the power companies.

Returns from the Residence K. W. H. Contest are being received daily at headquarters from 156 entrants in the contest. Striking gains in kilowatt-hour sales have been made by many of the power companies, which emphasizes the selling stimulation through this activity of the Merchandising Committee.

All committees of the Merchandising Bureau will hold their meetings during the Commercial Conference at Chicago on March 20-22.—C. E. G.

Industrial Heating Clinic

AN INDUSTRIAL Heating Clinic will be held at the Case Engineering School, Cleveland, on May 13th to 24th, under the auspices of the Industrial Heating Committee of the Commercial National Section.

In addition to the class room meetings, there will be inspection trips made to Cleveland and Detroit. The plans of the committee are such that every commercial executive that is serving communities with potential sales possibilities for industrial heat applications, will be justified in sending at least one salesman to the Clinic. The National Electric Manufacturers Association is cooperating with our own Association in conducting the Clinic.

Commercial National Section Conference, March 20-21-22

GROUP meetings of the Commercial National Section will be held at the Edgewater Beach Hotel, Chicago, March 20 and 21. The Executive Meeting of the Section will be held March 22.

On March 19 and 20 the Great Lakes Division will hold a Merchandising Conference at the Edgewater Beach Hotel. to which all commercial men are cordially invited to attend.

Schedule National Section Meeting

Committee	Wednesday, 20.	Thursday, 21.
LIGHTING BUREAU		
Commercial and Industrial Lighting	10:30 A. M.	
Electrical Advertising	10:30 A. M.	
Home Lighting		9:30 A. M.
Street Lighting	9:30 A. M.	
MERCHANDISING BUREAU		
Domestic Electric Range		9:30 A. M.
Merchandising Sales		9:30 A. M.
Refrigeration		9:30 A. M.
Water Heating	9:30 A. M.	
POWER BUREAU		
Commercial Cooking	9:30 A. M.	
Electric Truck		9:30 A. M.
General Power	9:30 A. M.	
Industrial Heating		9:30 A. M.
GENERAL		
Customer Relations	9:30 A. M.	
Promotional Rates		9:30 A. M.
Wiring Sales		9:30 A. M.

Pacific Coast Commercial Section Meeting

By Cristel Hastings

Pacific Coast Electrical Association

ONE of the most successful and well attended conclaves held thus far by the Commercial Section of the Pacific Coast Electrical Association was held in Los Angeles on January 17 and 18, under the Chairmanship of Mr. James F. Pollard.

Possibly the outstanding feature of the gathering was the talk presented by Mr. G. B. Buck, manager of the New Business Department of the Public Service Company of Colorado, on Sales Personnel and Merchandising. The address was made visually interesting by a series of charts and cartoons sovering various phases of the address. Predicting that as far as merchandising is concerned the battle ground of the future will be on the door-step of the home. Mr. Buck succeeded in driving home a salient point on Merchandising. This comprehensive talk was one of the best with which the Commercial Section attendants have been favored to date.

During the conclave a joint session was held with the Western Metal Trades Congress, and which was attended by approximately 200 members of the two groups. Splendid talks were made by Mr. N. R. Stansel of the Industrial Engineering Department of the General Electric Co., Schenectady, N. Y., and by Mr. T. C. Kelly, Industrial and Heating Apparatus Manager of the Westinghouse Elec. & Mfg. Co. Both of these addresses were ilustrated by lantern slides and showed the great variety of applications of electric heat in the metal industry such as welding, baking enamel, and the tempering of metal parts. Immediately following these addresses there was shown the Industrial Heating film prepared by the N. E. L. A. Industrial Heating Committee last year.

Still another address of importance was that presented by Mr. Harry Tuttle, Manager of the Parmalee Dohrmann Company, on the subject of Merchandising. Mr. Tuttle laid particular stress on the importance of catching the attention of the public in new and striking ways as well as upon the selection, training and inspiration of sales personnel.

The conclave closed with a report by the various Bureaus of the Section on progress to date in all activities. It was reported that the Agricultural Handbook prepared by the Agricultural Power Committee under the direction of Mr. E. G. Stahl, Chairman, was ready for the press and would be available for distribution shortly by the Pacific Coast Electrical Association. Another booklet that has been completed is that of the Employee Essay Contest descriptive of the second annual contest conducted by this Committee covering a comprehensive subject of general interest to the industry. The subject chosen for the current year's contest is "Why I Would Like to Live in a Red Seal Home."

The final conclave of the Commercial Section will be held in Fresno, Cal., during the latter part of March, at which time all of the Committees of the Commercial Section will present data and material covering the activities of the Section during the Administrative Year 1928-1929.

ACCOUNTING SECTION

J. F. Ford, *Chairman* Fred W. Herbert, *Director, Service Department*

Group Meeting Accounting National Section

THE second group meeting of the Accounting National Section for the administrative year was held at the Palmer House, Chicago, Ill., on Monday and Tuesday, February 25 and 26, under the chairmanship of Mr. John F. Ford, Chairman of the Section. Each succeeding meeting of the Accounting National Section, both in attendance and in constructive work, shows decided improvements and most satisfactory accomplishments by the standing committees of the Section. The attendance at this meeting exceeded any previous group meeting, over one hundred of the committee personnel being registered, including officers, chairmen of the eight standing committees and geographic division representatives.

The program provided for sessions of the several committees on the morning and afternoon of the first day and the morning of the second day, for the consideration and deliberation of subjects later to be formulated into serial reports outlining the accomplishments of each of the committees and studies which these committees have made on very vital subjects to the member companies through the coordinated viewpoint and survey made by these separate committees.

Get-Together Luncheon

Commencing with this administrative year, an innovation was introduced in the meetings of the Accounting National Section by which a get-together meeting of a general character was held at noon, the first day of the session, as a luncheon meeting. At these meetings, accountants, engineers, and commercial men from the operating companies in and around the meeting place of the section are invited to participate, with the thought that others outside of the Accounting Section might get a great deal of constructive information through these group meetings. About 225 members attended this luncheon meeting, at which stirring addresses were made by Mr. John F. Gilchrist, Vice-President of the Commonwealth Edison Company, and Mr. William J. Hagenah, Vice-President and Special Counsel of the Byllesby Engineering and Management Corporation. Mr. A. Jackson Marshall, Secretary of the Association, outlining a tentative program of the convention and exhibition to be held in Atlantic City, June 3 to 7. He emphasized that one afternoon would be devoted to a special session of the Accounting National Section and it is hoped that a large representation of the accountants of all public utilities and member companies will take advantage of this opportunity and be at this convention, as the speakers and subjects to be presented will be of great interest to the accountants as well as executives attending the convention.

Committee Work

At the meeting of the Executive Committee, chairmen of the several standing committees of the Section outlined to the Executive Committee the work which their committees are accomplishing during this administrative year. At this meeting reports were made also by representatives of like committees in the Geographic Divisions. It was gratifying to hear from these reports that wonderful progress has been made in the Geographic Divisions this year and the reports also showed how fully the Geographic Divisions are contributing to the work of the National Section. The Accounting National Section is dependent upon the coordinated work of the Geographic Division representatives and is getting the most hearty and satisfactory support from the several divisions.

Exhibition

An interesting report was made by the Exhibition Committee outlining the program for the exhibit at the convention of machine billing and machine application in the operation of public utility companies. It is felt that this exhibit will be one of the most instructive and interesting features of the work of the Accounting Section for the entertainment and instruction of delegates from accounting departments of member companies.

In this connection the section is under obligations and extends its thanks to Mr. B. F. McGuire of the Commonwealth Edison Company, Chicago, for putting on a most instructive exhibit at the rooms of the Commonwealth Edison Company of the mechanical devices used by that company in customers' records and billing and other operations of the company. This exhibit was well attended and was pronounced a most interesting display of the accomplishments and advancements in machine operations by public utilities. It is the intent of the Exhibition Committee to enlarge on this exhibit for the benefit of accountants during the national convention.

Subjects Being Considered

There are a great many important subjects which are being considered by the Accounting National Section committees, subjects which are creating a great deal of national interest, such as interchange of power accounting, merchandise accounting, the international discussion on change of calendar, financial problems which have been presented to the Corporate Finance Committee, and a number of allied subjects. The Accounting National Section feels that it is doing excellent work by giving these subjects immediate and careful consideration and by widely disseminating the information which these committees secure.

The Chairman was empowered at the meeting of the Executive Committee to appoint a Program Committee, which will meet shortly and outline a program for the session of the Accounting National Section at the convention. The Chairman was also empowered to appoint the Nominating Committee to report at the Executive Committee meeting just previous to the convention.

F. W. H.

RURAL ELECTRIFICATION

The Cost of Electric Service to Farmers

Report of Minnesota Rural Electric Service Conference

By **Charles F. Stuart**

Chairman, Rural Electric Service Committee, N. E. L. A.

WHENEVER a company rural electric man talks to farmers about building a line to serve an agricultural community in any part of the United States invariably the first thing the farmers want to know is what the service will cost them. Most of the farmers are pretty well sold in advance on "what a nice thing it would be" to have electricity on the farm. That part of it does not require much selling. They all say something like this:

> "Sure I would like to have electricity and so would the wife and the rest of the family, but I don't know that I can afford it. I have so many expenses now that I don't feel like taking on much more. You know how things are. Everybody in the family wants electricity but we can't have it unless the cost comes within the limits of the farm pocketbook."

There was held in Minneapolis, Minn., Jan. 28 and 29 last, a Rural Electric Service Conference, the second of a series of such meetings being held in the Geographic Divisions of the National Electric Light Association in cooperation with the National Rural Electric Service Committee. At this conference a number of speakers developed some extraordinary facts intimately related to this question being asked by thousands of farmers from the Atlantic to the Pacific and from Mexico to the Canadian border—the question of "how much will it cost?"

These speakers offered direct and indirect testimony of a most emphatic nature, that electric service properly employed on the farm costs exactly nothing at all, or, to go a step farther and to be more exact, that it is likely to prove a good financial investment, an actual money maker.

It is too early to predict that on any farm anywhere in the United States electricity can be made a good investment, that it can be used so that it will more than pay its own way, but certainly it is encouraging to hear from men who are in a position to know, who can speak authoritatively, who have been keeping actual records, that at least on a number of farms electricity has proved that it fully pays its own way.

The Red Wing Project

Professor E. A. Stewart, formerly Project Director for the University of Minnesota on the Red Wing experimental farm line, was the first speaker to offer definite information on this point. He had before him a most voluminous report, hundreds of pages of it, containing definite data pertaining to the first four years during which electricity was used on the Red Wing farms. This report shows, Professor Stewart said, that on the five farms for which continuous records are available, the gross income the fourth year was 42.9 per cent in excess of the first year, and that the operating expenses during the four years had increased but 1 per cent. Had it not been for a material boost in taxes, operating expenses would have shown a decided decrease. The net earnings for the five farms showed an increase of 81 per cent. In the operating expenses is included the bills paid the power company for electric service. These bills for 1927, which was the fourth year, showed an average of $14.76 per farm per month for an average consumption of 243 kw-hr. per farm per month. These figures, however, Professor Stewart explained, do not cover all the cost of electric service.

"There is another item," said Professor Stewart, "one which I think has been generally overlooked, and that item consists of the overhead charges on the investment the farmer makes in equipment. On these five Red Wing farms there was installed equipment which, if figured at regular retail prices, would have cost $16,667. Perhaps I should explain that this is not all strictly electrical equipment, but it all came as the result of electricity. I have included in this total such things as plumbing, bathrooms, a couple of furnaces, and not only the motors which operate the farm implements but the implements themselves. I have figured 12½ per cent to cover interest and depreciation on this investment. This is only a business-like procedure, and for the fourth year, 1927, this would have called for a charge of $2,083. It is interesting to note that this overhead on the farmer's investment in equipment amounts to about two and a half times his bill for electric current, so it will be seen that the bigger cost to the farmer in electric service, if he is well electrified, is not the cost of electricity, but the overhead on his investment in equipment.

"However, it is equally interesting to note that when we subtract this $2,083 from the net income for 1927, we still have an increase of 50.9 per cent in the net for 1927, as compared with the net for 1924."

Professor Stewart conceded that perhaps electricity is not entirely responsible for the much improved financial condition of these Red Wing farmers. He declared that the fact that many agricultural college men frequently visited these farms and perhaps offered helpful suggestions might have had something to do with it, and also the fact that the farmers were compelled to keep records made them better business men. But whether or not there were other influences, Professor Stewart certainly was armed with a powerful array of data showing definitely how on scores of farm operations electricity had cut labor costs or increased production, or both.

He offered much to sustain a contention that in the main, at least, the improved financial condition was due to liberal and intelligent use of electric energy, and emphasized that no one who studies the situation at Red Wing can get away from the fact that this improvement started when the farmers first began using electricity and has continued steadily ever since and that the end is not yet.

The Renner Project

Then came Professor R. A. Patty, South Dakota State College, who is Project Director on the Renner, South Dakota, experimental line. He had more to offer along the line of electricity paying its way on the farm. While on the Red Wing line, most of the equipment was loaned or donated to the farmers, on the Renner line the farmers have bought all their own equipment excepting two feed grinders which were used for a short period.

Professor Patty first gave the members of the conference information as to what equipment the farmer buys when he is investing his own money. There were seventeen customers on the original Renner line. As the first step, all of them wired their homes and farm buildings and, in most instances, did an adequate job of it when they were shown that it is poor economy to install flimsy and inadequate wiring systems. All seventeen installed lighting systems for the most part practical and adequate. Within the limits of three months sixteen of them bought washing machines, and shortly after the seventeenth made it 100 per cent. They all bought electric irons, and they all turned to electricity to pump their water, many of them abandoning windmills.

There were two milking machines when the line was built and now there are nine, all operated by electric motors. Most of the farmers have installed utility motors in the farm shops to run the lathe, drill, saw, and other farm shop machinery. Nine of them have electric refrigeration for household purposes. In addition, there are motors on the various farms grinding feed, cutting ensilage, husking and shredding corn, mixing cement, and performing other tasks. Quite a number of the farmers have installed electric ranges.

There are now nineteen farms on the line and during the five-year period the consumption of electricity has mounted steadily until it now exceeds 150 kw-hr. per month per farm.

Professor Patty was asked whether

electricity had paid its own way on the Renner line. His answer was immediate.

"I have not made an economic study such as Professor Stewart made at Red Wing," he replied, "but I feel, in fact, I absolutely know, that electricity has not cost these farmers a cent. In making this statement I have information of my own to go by and, in addition thereto, quite a number of the farmers have volunteered just such a statement to me. They know it themselves."

Here were two agricultural college men offering definite data that electricity at least on these Minnesota and South Dakota farms can be employed in such a manner that it is not an added expense to the farmer.

A Farmer Testifies

The next evidence was offered by a farmer himself who has kept figures, who knows whereof he speaks. His name is H. A. Schimmelpfenig, who has a poultry farm near Chaska, Minn. Before going into his story perhaps it is wise to explain that his farm was so situated that it was impossible for him to obtain service at anything like an average farm rate. It was necessary to build two miles of line to serve him and him alone, and, as a consequence, it was necessary to quote him a high monthly fixed charge, in fact, a figure that would stagger the average farmer. But it did not stagger him. He asked that the line be built.

His current consumption last year reached a total of nearly 15,000 kw-hr., and as a result of this heavy consumption his fixed monthly charge did not interfere materially with his earning a low unit rate. In fact, he stated that his energy, including the fixed charge, was costing him about 4c. per kw-hr.

It is interesting to note in connection with Mr. Schimmelpfenig that his farm home and buildings do not constitute a pretentious place. In fact, they are not suggestive at all of a likely farm electric customer, all of which goes to show that it is not always the big and pretentious farm home which proves an acceptable customer to the company.

Now getting down to Mr. Schimmelpfenig's story.

"To break even on poultry farming," he said, "one must get an average of 100 eggs per hen per year. At that rate the farmer neither makes nor loses money. He is just standing still. Without entering into a discussion of breeding, which is a big subject in itself, I should say that the average hen, left to her own resources, produces less than 100 eggs per year. To make a success of poultry farming we must aid mother nature. Electricity provided its first aid on my place when I lighted my henhouses and, as a consequence, my hens have been producing an average of 130 eggs per bird per year. It will be seen right away then that in this one application alone electricity put me on the profit side of the ledger.

"The next use was for incubation. No competent poultry farmer leaves incubation to the hen in this day and age. Biddy's way of doing things is antiquated. She sneaks off by herself and lays 13 to 15 eggs and proceeds to set on them. The commercial incubator makes her efforts look silly. I have two incubators of 16,000 egg capacity each. They were both oil incubators but I had them equipped with electric elements, leaving one, however, so that I could continue to operate it with oil in order that I might have a check on the relative cost and efficiency of both types of incubators. On the 4c. rate which I am earning on my place, I found the cost of oil and electricity about the same, but electricity gave me, due, probably, to accurate heat control, a 9 per cent greater hatch. Here again electricity is helping me make a success of my poultry farm.

"The third application was for brooding. Most poultry farmers sell day old chicks. I do also, but in addition thereto, I have gone into the business of selling two weeks' old chicks. I found that the highest percentage of mortality occurs during the first two weeks due, largely, to lack of knowledge and lack of equipment in taking care of baby birds. I charge 7c. extra per bird for keeping them over the first two weeks' period. I installed electrically heated brooders in a room 20 x 24 ft. They have a capacity of 8000 birds. Due to the use of electricity, I was able to install four decks of brooders in this room. With coal heat for brooding, I would have required a room several times as large. I have found the thermostatically controlled electric heating of brooders a splendid investment. The temperature never varies a whole degree from the desired heat. I start the baby birds off at a high temperature and then every few days reduce that temperature. My mortality rate during the first two weeks' period has been less than 1 per cent, and I am making an additional profit in taking care of these birds over the first 14-day period. It is electricity which contributes largely to that profit.

"I also use an electric hot plate, an electrically operated milking machine for my cows, an electric motor for water pumping, and electricity for various other purposes around the place. My bill runs over $100 a month, but for me it has proved an excellent investment, and I doubt very much whether my farm would be on the profit side of the ledger were it not for electricity."

This bill of more than $100 a month is not offered as an average which the farmers in the United States would have to pay for electric service. Rather it is cited as an instance where electricity has paid its way despite an exceptionally high bill, and nobody can argue Mr. Schimmelpfenig out of that.

Other Speakers

Indirectly, the writer offered the conference some further evidence along the line of electricity paying its own way on the farm. Recently, as Chairman of the Rural Electric Service Committee of the National Electric Light Association, I wrote to the chairmen of each Geographic Division Rural Service Committee, asking them to supply me three to five examples in each State in each division of actual farm customers who are using in excess of 3000 kw-hr. a year. I told the conference that I have received returns from more than forty States and that most of them sent all the way from two to ten times as many examples as requested and that they and many others with whom I have talked throughout the United States, are unanimous in the opinion that the liberal farm consumer is the satisfied farm customer. The consensus of opinion is that the farmer who uses only about 300 kw-hr. a year is usually more or less dissatisfied. When his consumption passes 1000 kw-hr. a year, he becomes a satisfied customer, and when it reaches 3000 kw-hr. he is enthusiastic. When it gets beyond there he becomes perfectly exuberant.

The significance of this statement is obvious. The farmer using 300 kw-hr. per year probably is paying what seems to him a high charge for a very limited service which he probably uses only for lighting, and rather inadequate lighting at that. While the farmer who is making liberal use of electric energy is not paying much more for it, but it is performing a much bigger service for him and, as the use increases, it is more and more likely that electricity is actually proving an excellent business investment for him.

Not only was much evidence offered at this conference that electricity could be made to pay its own way on at least many farms, but there were other speakers who offered much definite information as to how a company can organize a Rural Electric Service Department and how that department can aid and guide the farmer in intelligent use of the service.

Dr. E. A. White, Director of the National Committee on the Relation of Electricity to Agriculture, discussed the organization of company Rural Electric Service Departments and dwelt in particular on the organization of the Wisconsin Power & Light Co., with headquarters at Madison, Wis. The Rural Department of that company is described fully in a serial report of the National Rural Electric Service Committee published recently.* Dr. White also described other methods for company rural organizations.

C. P. Wagner, in charge of the Rural Department of the Northern States Power Co., gave some valuable suggestions as to how a rural department can put electricity to work on farms served by the company. He referred first to some five hundred customers of the Northern States Power Co. of Wisconsin. These customers were taken on a number of years ago before this company was owned by the Northern States Power Co. In some cases the lines built were hardly adequate to meet the present-day conception of farm business and, in addition thereto, most of the farms were inadequately wired. In 1926, the average consumption on these farms was 28 kw-hr. a month. When rural men got on the job in 1927, they boosted this average to 44 kw-hr., and, in 1928, to 66 kw-hr. This, Mr. Wagner said, was evidence of splendid work under adverse conditions. Several hundred customers taken on in the last three years by the Northern States Power Co. in Minnesota and the two Dakotas, each one of which has had the benefit of guidance from the Rural Department, already are averaging 150 kw-hr. a month.

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*N.E.L.A. Pub. No. 289-12.

Mr. Wagner went into detail as to ways and means of advising the farmers in the use of electricity and at the same time stayed away from any suggestion of telling them how to farm.

More than 150 persons registered at the rural conference, the first of its kind held in this part of the nation, and the second of its kind in the United States. They represented power companies, agricultural colleges, agricultural press, country press, farmers, manufacturers of farm and barn machinery, and manufacturers of electric equipment. The idea back of the conference was for everyone who has been experimenting and investigating these last five years to get together for a free-for-all interchange of problems and ideas.

There were many other speakers who contributed to the success of the conference. F. S. Rice, Minnesota Power & Light Co., Duluth, Minn., went into the subject of rural distribution systems. B. E. Miller, Wisconsin Power & Light Co., Madison, Wis., spoke on rate structures. John Pike, General Electric Co., talked on farm wiring. Herman Schmechel led the discussion on Professor Stewart's Red Wing report. J. T. E. Dinwoodie, editor of the *Dakota Farmer*, Aberdeen, S. D., was particularly impressed at the array of evidence that electricity can pay its own way on the farm. He advised the rural men that the farmer does not care to hear about voltages, amperes, and kilowatts, but wants to know much about the dollar value of electricity on the farm.

Preston Hale spoke for the county agents and declared he found the meeting so interesting that he wished every county agent in the three States were present. James C. Morrison, past-president of the Minnesota Editorial Association, declared his appreciation of the economic side of electricity on the farm but that he, as an editor, and somewhat of a sentimentalist, was more interested in the humanitarian side.

David Gustafson, Thief River Falls, Minn., spoke for the implement dealers. Andrew Nelson of the Westinghouse Electric and Manufacturing Co., discussed selling equipment to the farmer.

John F. Reed, Chairman, Minnesota Committee on the Relation of Electricity to Agriculture, and Robert F. Pack, vice-president and general manager of the Northern States Power Co., were the speakers at the dinner meeting. Both expressed satisfaction with the progress being made in the North Central Division in applying electricity to agriculture, and both counselled that the work must continue to proceed in a safe, sane and sound manner. They emphasized that it is as much of a mistake to proceed too speedily as too slowly.

It should not be assumed from this article that farmers everywhere are going to be able to employ electricity so that it will come to them at no cost. The farms covered in the talks made by Professor Stewart, Professor Patty and Mr. Schimmelpfenig, are mostly dairy and poultry farms, where they grow most of their own feed. The reports made by these men are of infinite importance so far as farms of this character are concerned, and gives the whole rural situation a more optimistic aspect than anyone dared to hope for five years ago, but there is still much to be done. There are other types of farming as, for example, the big grain farms characteristic of the Central Western States. Here, often there is only one possible customer to a mile of line, and ways and means for the farmer to employ electricity profitably are not nearly so obvious on these farms.

There are the big cotton plantations of the South where again distances between farms often are considerable, and here it is more difficult to find ways profitably to employ electric energy, though it is interesting to note that at the recent rural conference at Dallas, Tex., one of the speakers delivered a paper on profitable irrigation of cotton fields by the employment of electricity for water pumping.

This is just a note of caution at the end of this article so that no false impression may be conveyed, but it nevertheless does not dim the optimism of the North Central Rural Conference.

GEOGRAPHIC DIVISIONS and STATE ASSOCIATIONS

News Letter from East Central Division

By D. L. Gaskill
Secretary-Treasurer

WHILE out in the Central West and in the States of West Virginia, Kentucky, and Ohio the weather has been unusually cold and stormy, yet the activities of the East Central Division have not suffered in any respect either in lack of interest or attendance at meetings.

Practically all of the standing committees have had meetings located at some point within the division, and some of these meetings partook of the nature of a large convention. The Accident Prevention Committee, under the chairmanship of W. A. Buchanan, Appalachian Electric Power Company, Huntington, W. Va., has staged a contest to maintain a lower ratio of accidents, and he reports that great interest is being shown. The Meter Committee, with M. F. Smalley, Ohio Power Company, Canton, Ohio, held a meeting in Cincinnati on Feb. 15 and 16 that would have done credit to the National Meter Committee with an attendance of over 200 and great enthusiasm shown. The Prime Movers, Inductive Coordination, Overhead-Underground Systems Committees and Accounting Section have all had splendid meetings, at which a great amount of information was brought out.

Committee work in the division is being hurried a little more than in past years for the reason that our annual convention will be two months earlier this year than it has in the past. For many years the convention has been held in July at Cedar Point. This year the location was changed to Louisville, Ky., and in order to escape the hot weather of the South, the dates had to be moved up two months. This necessitates the close of the work of the standing committees two months earlier than usual, but all chairmen have promised to be ready for the convention.

The Power Survey of the East Central Division is now being distributed, and it is truly a work of art. This survey was nearly three years in preparation and justifies the amount that has been spent thereon.

Taking it all in all, the East Central Division was never in better shape and promises to do its full part for the year closing on June 30 and have everything in readiness for another splendid year beginning July 1.

Changes in Convention Dates

THE date of the 1929 convention of the New England Division, National Electric Light Association, has been changed from Sept. 16-19 to Sept. 9-12, inclusive. It will be held at the Hotel Griswold, New London, Conn.

The fourth annual convention of the Arizona Utilities Association will be held at the El Conquistador Hotel, Tucson, Ariz., on April 4-6 instead of April 18-20, as formerly announced. Many phases of the industry will be covered during a two-day business session. A third day will be given over to a sightseeing trip.

Conference on Employee Education, Southwestern Division

One of the most profitable meetings in the Southwestern Division this year was a conference of executives and educational representatives from member companies under direction of the Educational Committee of the division, held at Dallas, Tex., Jan. 25. About 40 were in attendance, including members of the Executive Committee, which met the same day—and all took part in the discussion. Dr. H. M. Blain, Chairman of the Educational Committee, presided.

"I have learned more about employee education and the solution of its many problems than I ever expected to know, and am going back to my company and put it into practice," was the general testimony as expressed by those in charge of employee education in the principal companies of the five States represented in the division.

Fred R. Jenkins, of Chicago, Chairman of the N. E. L. A. Educational Committee, detailed the purposes, content, and handling of the N. E. L. A. courses, and answered a number of questions on the problems of the representatives present.

A. J. Sarre, Educational Director of the New Orleans Public Service, told of the organization of his department, one of the most advanced in the country, with about 1150 employees in the various courses, and also answered questions of interested listeners.

C. J. Rutland, of Texas Power & Light Co., substituted for Z. Carson of San Antonio on "The N. E. L. A. Courses in Small Companies" in a most interesting talk. E. G. Green, Educational Director of Oklahoma Gas & Electric Co., spoke on "Special Kinks in Educational Work."

"Educational Activities Among Employees from an Executive's Standpoint" was the subject of an address by L. V. Sutton, Vice-President of the Mississippi Power & Light Co., Jackson, and inspired a number of talks by other executives, all of whom took a most decided stand for employee education and especially for the N. E. L. A. courses.

WOMEN'S COMMITTEE

Miss Sophia Malicki, *Chairman* **Miss Isabell Davie**, *Secretary*

News Letter

By Mrs. Thelma Van Ness

A new Women's Committee has been organized. *Northwestern Echoes* from Huron, South Dakota, tells us that the girls of the Aberdeen division of Northwestern Public Service Company held their first meeting in December.

* * *

A very successful annual Women's Conference, North Central Electric Association, was recently held in Minneapolis. Mrs. Mabel Wilson, chairman of the division, presided. The first speaker, Mr. L. M. Pharis, President of the North Central Electric Association, spoke on Public Relations. Mr. T. D. Crocker, Assistant General Manager of the Northern States Power Company, addressed the group. Miss Val Thorson, director of Home Service, gave a talk in which she stated that a Home Service Department is indispensable in carrying out the program of the Women's Committee. Mr. John Lapham gave an illustrated talk on "How Shall We Treat the Customer?" Miss Laurene Littell spoke on "Home Lighting," and Mr. W. H. Brown, of Minneapolis, Secretary of the Inter-Divisional Safety Council of the Northern States Power Company, emphasized the importance of safety work. Other members of the Women's Committee also took part in the program. This group is to have a news sheet entitled *Northern Lights* which will consist of news from the Women's Committees of the North Central Electric Association.

* * *

The Kentucky Women's Committee held a meeting during the recent convention of the Kentucky Association of Public Utilities at Louisville. Mrs. Beulah K. Yewell is chairman. About seventy-five girls were in attendance at the meeting.

* * *

The Synchronizer, company magazine of the Louisville Gas and Electric Company, will be edited by the Women's Committee in March of this year.

* * *

Mrs. Nell Laws, Chairman of the Women's Committee, Northwest Division, reports the Third Annual Conference of Women's Committees, Puget Sound Power and Light Company, held in Seattle, November, as an all-day session. All districts reported keen interest in Women's Committee work and splendid cooperation from the management. The work of the district committees was fully discussed and helpful ideas were exchanged.

* * *

The Women's Committee of the Washington Water Power Company, Spokane, presented the playlet, Wanted—A Stenographer, before the members of the Business and Professional Women's Club at its state banquet held in Spokane recently. This playlet illustrates many of the standards which the organization advocates for the business girl and was most favorably received by the members.

* * *

The appointment of Mrs. Mae H. Redd as Chairman, Women's Committee, National Electric Power Company, 57 William Street, New York, N. Y., was made by Mr. Harry Reid, President, last fall. Mrs. Redd's activities will include the organization of Women's Committees in properties of the National Electric Power Company, where none now exist, and the stimulation and coordination of programs of Committees already functioning. Mrs. Redd's duties will take her into the fourteen states in which her company operates.

* * *

A novel idea was initiated by the merchants in Wenatchee, Washington, this past holiday season when they decided on December 7 as the evening when all the townsfolk would be invited to "Open House" at the various business houses for the purpose of getting their ideas for Christmas shopping, although nothing was to be sold.

* * *

The Women's Committee of Puget Sound Power & Light Company, Wenatchee, decided that this was an opportunity for them to do something constructive, so they used this date to put on an Appliance Demonstration in the company salesroom. The committee is composed of only eight members and therefore it was necessary for each to have a very definite assignment. One member greeted the guests at the door and all who cared to register were given a chance on a toaster. Punch was served in connection with the electric refrigerator, others served waffles and syrup. Another demonstrated the electric ironer. The secretary of the committee presided at the coffee urn and demonstrated the toasters, serving toast and jam with the coffee. One member demonstrated the electric corn popper, and her table proved most popular with the kiddies.

The chairman of the committee took an active part in the demonstration. In addition to giving talks on the electric cooker, in which were displayed roast and vegetables, she also mixed waffle batter, made coffee, and kept things moving generally. The Wenatchee paper stated that the Puget Sound Power & Light Company's salesroom was the most popular place in town the evening of "Open House." In spite of very cold weather, about three hundred people were served.

* * *

The Public Utilities of West Virginia held their annual convention at Huntington recently and the Women's Committee took quite an active part. Mrs. Luella Fisher, Chairman of Home Service, American Gas Association, was the main speaker. She gave a very interesting talk on Opportunities for Women in Business. Miss Esther Rockey, Chairman, East Central Division, addressed the group and Miss Margaret Schneider, West Virginia

Chairman, gave a report. The playlet, Electrified Eliza was presented.

* * *

The Monongahela West Penn Women's Committee has made up programs for the year. Meetings are to be held once every two months consisting of a talk by one of the executives of the different departments and possibly a playlet put on by some of their own girls. It is their aim to invite a number of the executives' wives to each meeting.

* * *

Another bulletin has appeared. The Women's Committee of the Lake Superior District Power Company and the Michigan Gas and Electric (Northern) Company, with Miss Skulda Baner as editor, has published the first number which is a very comprehensive paper containing several pages of interesting short subjects on the utility industry.

* * *

The Women's Committee of Consumers Power Company, Michigan, held its semi-annual meeting recently in Jackson. District chairmen were present from the fifteen districts. The most important conference was held on Saturday morning at which health promotion and safety work received a great deal of consideration.

* * *

The Saginaw girls—also Consumers Power Company, Michigan—were hostesses at a Home Economics Matinee on the afternoons of Nov. 15 and 16 in the Saginaw office building. Twenty girls took part in an appliance demonstration during the afternoon of these two days, using an electric ironer, electric washer, waffle irons, toasters and percolators. More than five hundred visitors were received. Waffles, cinnamon and chocolate toast and coffee were served to the guests.

* * *

The Women's Committee of the Washington Water Power Company at Spokane served electrically popped corn to a Business and Professional Women's Club meeting recently.

* * *

The Women's Committee, Menomonie and Marinette Light and Traction Company, sponsored a safety demonstration before the Epiphany School and the Legion Auxiliary at Menomonie, Wis.

* * *

The Wisconsin Public Service Corporation women gave a cooking demonstration to two hundred guests representing the Catholic Women's Club at Oconto. They also put on the playlet, Let's Stay Married, before the Parent-Teacher Associations of Green Bay, St. Willebrord and Oconto and the Grace Lutheran Society at Green Bay. They also held a safety demonstration at Green Bay.

* * *

An interesting lighting feature was a Lighting Tea given by the Women's Committee of the Monongahela West Penn Public Service Company of Fairmont, West Virginia. In response to invitations sent to club women of Fairmont, two hundred persons attended. A talk on Home Lighting was given, the pantomime Evolution of Lighting, also. Copies of *Better Lighting* of the *More Power to the Home* series were distributed to guests. Wives of the executives of the company presided at the tea tables and assisted with the serving.

* * *

Miss Helen A. Smith of the Rochester Gas and Electric Corporation, Rochester, N. Y., reports that among her lamp shade classes is a Saturday morning children's class.

* * *

A home lighting course has been arranged by Miss Mary Wren Steward of the Union Gas and Electric Company, Cincinnati, Ohio, for the girls of her company. Each course will be four weeks long and classes will be held from five to six one day a week. The first lesson will consist of a short lecture telling of the purpose of the home lighting department and taking orders for lampshades. Twenty-five girls are enrolled for this first course and they will be given free of charge the material for a tailored parchment shade. The second lesson will consist of a one-half hour lecture showing proper lighting for different living room arrangements and the last part of the course, the girls will start their shades. The next two lessons will take the various rooms in the home in the same manner as they did the living room. Another course for another twenty-five girls will follow this first one and so on throughout the year.

* * *

The Consumers Power Company, Michigan, Women's Committee, at Owosso, entertained the Women's Club of that city recently, by presenting the pageant, The Evolution of Light.

* * *

The girls of the Lake Superior District Power Company at Ironwood, Michigan, have organized a safety team which gave a demonstration at a meeting of the Rotary Club in that city a short time ago. Four doctors present spoke very highly of the girls' work.

* * *

Why not furnish your public library with a set of the *More Power to the Home* booklets and other educational material on the use of electricity in the home? Miss Susan M. Brandon, Home Economist, Alabama Power Co., Birmingham, sent material of this kind to the Birmingham City Library. Since the material was presented, the library has shown a window display on artificial lighting in relation to interior decoration and the librarian has reported that the material given is being used for reference.

* * *

A Program of Safety for the use of local Women's Committees has been prepared by Miss Elizabeth Lee, Chairman, Women's Safety Sub-Committee, Accident Prevention Committee, N. E. L. A. Committees wishing to include Safety studies in their programs will find suggestions for activities in this outline. Copies will be furnished upon request to the Secretary, Women's Committee, N. E. L. A., 420 Lexington Ave., New York, N. Y.

* * *

The Home Service Department of the Interstate Public Service recently held eight American Home Institutes throughout the state which were sponsored by the American Home Department of the Indiana Federation of Women's Clubs.

The programs for these meetings included talks on Laundering, Meal Planning, Sanitation in the Home, Interior Decoration, Home Lighting and Lamp Shade Making and demonstrations of other electrical appliances.

* * *

Here are five recommendations to be followed by Women's Committees in the Middle West Division during this Association year, as announced by the Chairman, Miss Betty Ewing:

1. Know the company personnel and the territory served by company.
2. Fifty per cent of the girls to deliver a talk pertinent to the industry.
3. Safety First Work:
   Twenty-five per cent to have knowledge of prone Pressure Methods of Resuscitation.
   Seventy-five per cent to have knowledge of First Aid Emergency Methods.
   One hundred per cent to have Ideal of Safety First.
4. Specific knowledge of initial and maintenance costs, operation and care of two major and five minor appliances.
5. One general meeting including wives of employees.

MAGAZINE ARTICLES

Below is a list of articles which appeared in various magazines recently that are especially interesting to Women's Committee members:

Modern Priscilla—February.
What Electrical Equipment Shall We Buy?—Eloise Davison.
Your Home—February.
Let There Be Light—From Distinctive Fixtures—Helen Anderson Storey.
Delineator—February.
Little Things That Matter.
Good Housekeeping—February.
Housekeepers Discuss Dishwashing Machines With the Institute—Helen M. Whitson.
Newer Standards In Home Comfort—P. E. Fansler.
People's Home Journal—February.
Electrical Psychology in the Home—Donald A. Laird, Ph. D., Sci. D.
Short Cuts in Home Making—Emma F. Holloway.
Pictorial Review—February.
Safe Refrigeration—Helen Treyz Smith.
Ladies' Home Journal—February.
Women and World Peace—Mrs. John F. Sippel.

Picked up from

ELECTRICAL NEWS ITEMS

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Farmers Subsidized at Expense of Taxpayers

SOME interesting facts concerning results of attempting to subsidize the farmer at the expense of the taxpayers generally by the Hydro-electric Power Commission of Ontario are set forth in an interesting article by William M. Carpenter, appearing in the *Annalist*. One half of the cost of constructing rural power lines is paid out of the Provincial treasury and this cost cannot apparently be reflected in the rates.

"On October 31st, 1927," says Mr. Carpenter, "there were 9,757 farms (out of a total of perhaps 160,000 in a territory covered by 'Hydro' operations) which enjoyed the benefits of electric service; in addition there were also some other 15,526 consumers living in hamlets. To bring electricity to these rural areas, over 3,000 miles of lines were built, and for this construction the Province of Ontario granted, from the public treasury (and, therefore, out of general taxation) one half of all the costs, and has supplied a total sum of $3,332,286."

In other words, the general taxpayers have paid approximately $135 to supply service to each one of these individual consumers in rural districts. If this same policy should be adopted in the United States one wonders just how much our own Treasury Department would have to pay out if we add to the 350,000 electrified farms all of the consumers in hamlets which have received service because of electrification of rural areas and multiplied the total by $135? It is safe to assume that it would run into many billions.

Municipal Competitor Objects to Private Company Lowering Rates

IN the face of the constant reiteration on the part of advocates of government ownership and operation of public utilities that municipal plants always furnish light and power at rates lower than those of the privately owned companies it is something of a shock to learn that the managers of a municipal electric light plant have actually demanded, through the medium of the courts, the establishment of a *minimum rate* and have been granted a decision to the effect that a private company cannot charge *less* than that rate.

Out in Iowa the Iowa Public Service Company—privately owned and operated—reduced its rate. It had been getting 13 cents a kilowatt-hour and decided that 12 cents was enough. But the operators of the municipal plant at Mapleton, Iowa, thought differently. They were getting 13 cents, wanted to continue to do so, and did not propose to compete with any private company furnishing service for 12 cents.

A city ordinance granting a franchise to the Iowa Public Service Company, fixes the rate at 13 cents a kilowatt-hour. The whole scheme of government regulation of public utilities is that a maximum rate which will pay a reasonable return on the value of the property in use in the public service shall be fixed and the company can charge no more. If the rate charged is *lower* than this maximum rate it is a matter between the public utility and its customers.

But the municipal ownership folks in Iowa interpret the idea of government control and regulation quite differently. They claimed that if the rate was fixed at 13 cents it had to be 13 cents even though the public service corporation is willing to furnish service for less. Apparently they have proved it for the Iowa Supreme Court has decided, in a five to two decision, that the utility company must charge the citizens of Mapleton 13 cents a kilowatt-hour.

According to the Des Moines Register of February 13th the Court also held that a public utility operating under a franchise, such as was issued to the Iowa Public Service Company, has no constitutional right of competition. The question immediately arises as to how the privately owned and operated public utility can furnish service at a rate which will not exceed a reasonable return on the value of the property in use in the public service if the advocates of municipal ownership and operation can go into court and force it to charge a higher rate.

Electric Traffic Cops

NOT only have scientists developed the photo-electric cell to the point where it will take the place of traffic policemen but it can also avoid many unnecessary traffic delays. This was demonstrated recently at the New York Electrical Society by Dr. H. H. Sheldon, professor of physics at New York University, and Dr. Phillips Thomas, research engineer of the Westinghouse laboratories who is the "father" of the new robot.

It was explained that this invention was not so much applicable to New York and other big cities as to smaller communities where there is heavy automobile traffic on main thoroughfares and little traffic on side streets and cross roads.

Under the present traffic light system, it was added, the red light frequently holds up traffic on the main road while there are no vehicles waiting on the side street. The new invention makes it possible to give the motorist on the main road a continuous green light until a car on the side street comes to within a short distance of the intersection.

This is where the automatic eye comes into play. Underneath the side street and overlaid with a "mushroom" covering so as not to obstruct traffic, lies the sleeping robot. This giant of the machine age always sleeps with one eye open, and as soon as a vehicle crosses the mushroom covering, the shadow of the vehicle falls upon the automatic eyeball and awakens the robot to electric action.

His first impulse, which is automatic and never fails, is to switch the green light to red on the main road and the red to green on the side road, so that the car which has just caught his eye may cross the main road in safety. After a brief stated interval, if no other car on the side street casts a shadow upon his vision, the robot automatically obeys his next impulse which switches traffic lights back again to their original status and lets the main line traffic proceed.

The demonstration showed how the new system could automatically set right unusual situations. For instance, if an unusually long line of cars on the side street threatened to hold up main-line traffic too long, there is a time-limit relay cog in the robot which compels him to switch the signals again to give the main line a chance for the definite period.

Year's Job to Redesign Reflector for Searchlight

WHEN it was found that the mammoth searchlight constructed in one of New York state's factories about two years after the war did not attain its calculated efficiency of one billion candle power, the problem of bringing the instrument "up to scratch" was handed to two mathematicians. Specifically, their task was to redesign the reflector. It had been proved that the carbons were performing their duty in creating an arc of approximately the same temperature as the outer surface of the sun.

It took these two men one year to figure out the answer to the problem. Their solution was so accurate that now the searchlight is recognized as one of the largest in the world with a rated capacity of one billion candle power.

WHAT OCCURRED LAST MONTH

Consolidations

Stockholders of the Buffalo, Niagara & Eastern Power Company have voted approval of consolidation of their company and others in a new company to be called the Niagara Power Corporation.

* * *

Five electric companies in the Genesee Valley, New York, have been merged with the Rochester Gas & Electric Corporation, under authorization of the Public Service Commission of New York.

* * *

On Feb. 7 it was announced that the Associated Gas & Electric Company had contracted to acquire all the stock of W. S. Barstow & Co., Inc., which owns a majority of the voting stock of the General Gas & Electric Corporation, thus bringing under a single ownership public utility properties in 18 States with assets exceeding $500,000,000.

* * *

Announcement has been made of the formation of the Empire Public Service Corporation, which will acquire six companies having assets of $35,000,000 and systems in Ohio, Maryland, Colorado, and Oklahoma.

* * *

The Foshay interests of Minneapolis have bought the Cargill, Ontario, Electric Light & Power Company.

* * *

Announcement of plans to consolidate seven electric companies in Vermont into the Central Vermont Public Service Corporation has been made by the Vermont Hydro-Electric Company.

* * *

The Canadian Bureau of Statistics in a recent report discloses that small isolated plants in Canada are being rapidly supplanted by large central generating stations and interconnected systems. The United States Bureau of Census announces that in Kentucky small, isolated plants are being replaced by interconnected systems. In 1922, 111 individual commercial systems operated in Kentucky; by 1927 this number had declined to 33.

* * *

Properties of the Inland Utilities Company in western Oklahoma and northern Texas have been bought by the Texas-Louisiana Power Company of Fort Worth. A recent announcement tells of organization of the North American Gas & Electric Company, which, through subsidiaries, will own or control properties supplying service in the State of Washington and the Province of Saskatchewan.

* * *

Federal Trade Commission's Inquiry

On Jan. 25 witnesses at the Federal Trade Commission's hearing in Washington were Judge Stephen Davis, Director of the Joint Committee of National Utility Associations, and Horace M. Davis, of Lincoln, Neb., former Director of the Nebraska Public Utilities Information Bureau. Judge Davis was asked about the publicity of the Joint Committee, and stated that its activities in distributing press releases and pamphlets had gradually decreased until they were discontinued last spring. H. M. Davis told of activities of the Nebraska Public Utilities Information Bureau.

* * *

On Feb. 16 the case of the Federal Trade Commission against the Electric Bond & Share Company was argued before Federal Judge Knox in New York, Judge John F. MacLane and the Hon. John W. Davis appearing for the company and Judge Robert E. Healy for the Commission. A principal contention of the company is that it is not engaged in interstate commerce. It further holds that the subpoenas issued by the Commission constituted warrants and were contrary to the laws of search and seizure. At the conclusion of the hearing Judge Knox gave the Commission ten days in which to file a brief and allowed the company an additional five days to file an answering brief.

* * *

Former Chairman Myers of the Federal Trade Commission, appearing before the House Appropriations Committee, stated that the approximate total investment of the gas and electric companies reporting to the Federal Trade Commission, and involved in the Commission's utilities investigation, is $14,000,000,000.

* * *

Foreign

Reports from England are to the effect that the comprehensive readjustment of electric generating stations and the interconnection of transmission lines being carried on under supervision of the Central Electricity Board and the Electricity Commission is proceeding rapidly. Contracts aggregating $75,000,000 in connection with this development are to be placed within the next few weeks.

* * *

A review issued by the Canadian Bureau of Statistics shows that during the past five years the output of electrical energy from central electric stations in Canada has almost doubled, and during the past six years it has increased 136 per cent.

* * *

A. V. Winter, chief engineer, and B. E. Vedeneev, assistant chief engineer, of the Dnieper Hydro-Electric project under construction in Russia, and six other leading Soviet technicians, have arrived in this country to study American hydro-electric development and to participate in negotiations in regard to placing orders for equipment for the Dnieper plant.

* * *

Hydro-Electric

On Jan. 26 the Cumberland Hydro-Electric Power Company filed with the Federal Power Commission a brief supporting its application for a license for development of the power at Cumberland Falls.

* * *

Senator Wagner of New York, in a letter to Governor Roosevelt, has asked the Governor to state the attitude of New York toward the treaty recently negotiated between the United States and Canada for preservation of the scenic beauty of Niagara Falls and diversion of waters of the Niagara River for power purposes. Senator Wagner asks if Governor Roosevelt favors having works for preserving the Falls undertaken at private expense and making available for private utilization the additional water to be diverted. He asks if the State claims that its consent is a prerequisite before any disposition can be made of the additional 10,000 cubic second-feet of water made available by the treaty. He asks if the State claims the right to charge for the use of this additional water. Governor Roosevelt has not answered Senator Wagner's questions, but is understood to hold that the State does claim its consent is a prerequisite before disposition can be made of the additional diverted water and does claim the right to charge rental for the same.

* * *

A report by the Federal Power Commission says that California has feasible sites for increasing present hydro-electric energy installations from 2,000,000 hp. to 10,000,000 hp.

* * *

Rates

The Knoxville, Tenn., Power & Light Company announces rates, effective March 1, which will save customers $50,000 a year.

* * *

The McCook, Neb., *Gazette* lists the following Nebraska towns as having voluntary reductions by the companies serving them: Mitchell, Scottsbluff, Minatare, Melbeta, Bayard, McGrew, Northport, Bridgeport, Broadwater, Dalton, Gurley, Lewellen, Brule, and Ogallala.

* * *

The suit of the Cambridge Electric Light Company against the order of the Massachusetts Department of Public Utilities, calling for reduction of the domestic and commercial lighting rate from 8 cents to 5½, has been withdrawn.

* * *

Special Master Henry E. Warner, appointed by the Federal court to investigate the order of the Massachusetts Department of Public Utilities reducing the domestic and commercial lighting rate in Worcester from 7 to 5 cents, has reported in favor of the 5-cent rate, but upholds completely the Worcester Electric Light Company's position in regard to reproduction cost as a basis for valuation.

* * *

The Duke Power Company has announced reduction in industrial power rates for North and South Carolina which will save consumers approximately $500,000 annually.

* * *

Regulation

The City Club of New York and the Public Committee on Power of New York State have asked Governor Roosevelt for an investigation, under the Moreland Act, of the regulation of electric companies by the Public Service Commission of New York. The New York *World* is urging a broader investigation of the whole question of utility regulation.

* * *

A bill has been introduced in the Maine Legislature calling for a study of the water-power situation in Maine by a Recess Committee of ten citizens to be appointed by the Governor.

* * *

Governor Cooper of Ohio has recommended repeal of the Pence Utility Law, which allows public utilities to put an increased rate into effect in advance of a decision from the Utilities Commission.

* * *

A bill has been introduced in the Indiana Legislature proposing that purchase, construction, and regulation of municipal utilities be taken from the jurisdiction of the Indiana Public Service Commission. Control of municipal utilities would be given solely to common councils of larger cities, town boards or trustees of smaller ones, and to joint commissions where the property is owned by more than one city or town. This bill has been indefinitely postponed. This is expected to mean that the bill will not be brought up again at the present session of the Legislature.

* * *

Three bills bearing on utilities have been introduced in the Wisconsin Legislature. One would repeal the indeterminate permit law; another would repeal the statute pertaining to the issuance of certificates of convenience and necessity, and the third would permit municipalities and cooperative associations to build and operate public utilities.

* * *

Governor Reed of Kansas, in his inaugural message, announced his intention to have the Public Service Commission make a thorough investigation of public utility rates and adjust them on a fair basis.

* * *

Governor Caulfield of Missouri has recommended legislation to facilitate the work of the Missouri Public Service Commission in making rate-base valuations.

A bill has been introduced in Texas Legislature placing utilities under the administration of the Railroad Commission. It is being opposed by the Municipal Utilities League of Texas.

* * *

Governor Patterson of Oregon has recommended that the State's existing water-power laws be amended so that the State may receive fees from all persons and corporations acquiring vested rights to the use of public waters for developing power.

* * *

A bill has been introduced in the California Legislature, proposing that State taxes be levied on municipally-owned public utilities, as well as on privately-owned utilities. Another bill which has been introduced forbids the use of public utilities' funds in California for political campaigns.

* * *

A motion has been introduced in the Maine Senate that a special committee of 21 members of the Legislature be appointed to consider the general question of exportation of hydro-electric current and all bills pertaining to it.

* * *

Senator Black of Alabama proposes that the Watson Bill, to extend the life of the Federal Radio Commission, be amended to bar ownership or operation of radio broadcasting stations by public utility corporations. He intends to introduce an amendment to that effect.

* * *

The Washington State Senate on Feb. 1 rejected the bill initiated by the Washington State Grange authorizing formation of districts which would own and operate electric systems. As the bill was before the Legislature by an initiative petition, it now goes before the voters in 1930. Another bill before the Washington Senate provides that cities owning electric plants shall have the right to sell current to other cities and towns.

* * *

A bill to create a new system of public utility taxation has been introduced in the Wisconsin Legislature.

* * *

The annual report of the Public Service Commission of New York State urges legislation which would bring utility holding companies under the jurisdiction and supervision of the Commission. It also advocates legislation to bring submetering concerns under the Commission's jurisdiction.

* * *

Bills have been introduced in both Houses of the New York Legislature providing for creation of a commission to inquire into the regulation of utilities in New York and to draft legislation to make regulation more effective.

* * *

A bill has been introduced in the Maine Legislature providing that the Governor and Council shall appoint five commissioners to represent Maine upon a joint commission including the other New England States, having the purpose of entering into a compact or treaty with the consent of Congress to cover all matters relating to the water-power resources of the States.

* * *

A bill providing for election of members of the Public Service Commission, heretofore appointed by the Governor, has been introduced in the Maryland Legislature.

* * *

Bills introduced in the Missouri Legislature include: An act calling for creation of a State Power Commission which would make a complete survey of the water-power resources of the State and prepare laws for State regulation of water power; a bill to amend the Public Service Commission Act with regard to procedure in valuing utilities, this providing that 7 per cent is to be held a fair and reasonable return on utilities' property; a bill to limit operation of municipally-owned water, gas and electric plants to the territory of the city concerned unless permission to extent is obtained from the Public Service Commission; a bill providing that a municipally-owned plant cannot be leased, sold or otherwise disposed of except by a two-thirds vote at a special election.

* * *

A committee of the Texas Senate has reported favorably a bill providing for creation of a Public Utilities Commission of three members, which would have original jurisdiction over unincorporated towns of 2000 or less, and appellate jurisdiction over incorporated towns and cities, municipal plants to be exempted.

* * *

A bill introduced in the Idaho Senate prohibits export of power from the State.

* * *

A bill introduced in the Washington House of Representatives provides that cities now or hereafter owning or operating electric plants shall have the right to sell to other cities and towns at wholesale, but does not authorize retail distribution outside city limits. Another bill introduced in the House removes the tax exemption feature from real and personal municipally-owned property in competition with private property.

* * *

On Feb. 21, the Maine Senate passed the Murchie order calling for an economic investigation of water-power export by the Joint Legislative Committee assigned to consideration of power measures.

* * *

A second bill providing for a survey of public utility regulation in New York State has been introduced in both Houses of the New York Legislature by leaders of the Republican forces. This bill calls for an Investigation Commission of nine members.

* * *

A bill before the Vermont Legislature provides for taxation of electric energy generated in the State at the rate of one mill a kilowatt-hour, with exemption after payment of 10,000,000 kilowatt-hours a year.

RELATED and other ORGANIZATIONS

Index to Standards and Tentative Standards

THE American Society for Testing Materials has recently issued a general Index to all of its Standards and Tentative Standards. This Index, which will be issued annually, should be most useful to all of those concerned with Standard specifications. Copies may be obtained free of charge by application to the American Society for Testing Materials, 1315 Spruce Street, Philadelphia, Pa.

Midwinter Meeting A. I. E. E.

AT the midwinter meeting of the American Institute of Electrical Engineers, held at New York, Jan. 28-Feb. 1, operating men, manufacturers' representatives and research investigators had an excellent opportunity to find something of interest in practically every session. Not only did the papers and discussions cover a wide field of activities, but many outstanding subjects were considered. Great progress was shown in appealing to scientific, design and operating interests by the more balanced attention given each group.

Among the papers and discussions were studies of lightning and protective measures, results of further research into the mechanism of cable breakdown and methods of preventing it, developments in high-speed circuit breakers, particularly the "Deion" breaker and experience therewith, performance and economy of the capacitor induction motor, prevention of excess voltages in transformers by a nonresonating construction, and physical tests that place commutator design on a more scientific basis were among the subjects which commanded most attention. Standard test voltages for initial installations and radio beams as guides for airplanes were also discussed.

Convention Will Reveal Oil Heating Progress

AN EXPOSITION depicting the rapid development of the oil heating industry and modern oil equipment will be one of the features of the sixth annual convention of The American Oil Burner Association to be held in The Hotel Pennsylvania in New York, April 9th, 10th and 11th.

Arrangements are being completed for an attendance of between 2,500 and 3,000 delegates, representing the oil heating industry and allied industries in all parts of the United States and Canada.

Elliott Harrington, of the Industrial Engineering Department of the General Electric Co., will speak on the subject of "The Part Electricity Plays in the Operation of Domestic Oil Burners."

National Chamber of Commerce Meeting

THE National Chamber of Commerce Seventeenth Annual Meeting will be held in Washington, D. C., April 30 to May 3, 1929, preceded by a meeting of the National Councillors on April 29.

Western Pennsylvania Engineers Banquet

SEVERAL hundred engineers attended the 48th annual banquet of the Engineers' Society of Western Pennsylvania held at the William Penn Hotel, Pittsburgh, Pa., Feb. 4. The speakers of the evening were Messrs. Charles Cason, and Paul S. Clapp. Mr. Frank R. Phillips was toastmaster. Mr. J. N. Chester is president of the society.

THE IDEA MILL

Moisture-Tight Containers for the Shipment of Transformer Oil

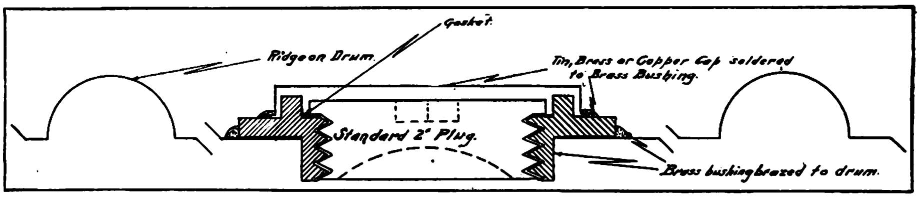
By J. E. Busher*

TRANSFORMER oil shipped in drums is very likely to absorb moisture during shipment or storage. This is very readily admitted by the manufacturer, who claims that with the present type of seal on oil drums, it is impossible to seal out moisture and the only way oil can be shipped to insure a high dielectric strength is to ship it in tin containers with a soldered seal.

Our experience during the last year has been that transformer oil received in drums, in most cases, has shown a very low dielectric strength due to the fact that moisture was present in the oil. Fortunately, it has been our policy to always test the oil before it was put into electrical apparatus. Possibly some of the smaller companies do not make this check, assuming that the oil as received from the manufacturer is in good condition. I feel that where this has been done, oil with too low a dielectric strength has, in a good many instances, been put into high voltage apparatus. Operating companies and industries using transformer oil should insist that such oil be shipped in containers that will absolutely guarantee the oil being received is in a condition suitable for immediate use without any doubt as to its high dielectric strength.

Oil that we tested after shaking the drum up and taking a sample out of about the middle of the drum has broken down, under test, at as low as 10,000 kv. It is our practice never to use oil with a lower dielectric strength than 22,000 kv. and the bringing of the oil up from 10,000 kv. to 22,000 kv. has been a considerable expense and annoyance, which could have been avoided if the oil drums had been properly sealed.

The sketch shows how this could be done by the manufacturer so that oil with a high dielectric strength can be insisted upon by the operating companies, which I feel should be done.


Gasket.
Ridgeon Drum.
Tin, Brass or Copper Cap soldered to Brass Bushing.
Standard 2" Plug.
Brass bushing brazed to drum.

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*Superintendent, Electric Station Construction Department, Kansas City Power & Light Company.

A Tip for Advertisers

FREE advertising service is being offered by the Electrical League of Colorado to those building and selling houses in that State. The offer of the organization is being broadcast to builders and owners of houses that are wired according to the minimum Red Seal specification.

The announcement of this idea for cooperation specifies that the league will pay the cost of a six-line classified advertisement featuring the sale of a Red Seal house for the period of one week, including Sunday. Four lines of each ad may be used to describe the type of construction, number of rooms, location, price, terms, and to list the name and address. The remaining two lines are to be used by the league to call attention to the adequate electrical installation. The only provision is that the house offered for sale must have at least the minimum Red Seal requirements. All copy for such advertising is to be submitted to the league, which will, in turn, place the order with the paper that the builder or seller suggests.

THE REVIEWING STAND

Prometheus U. S. A. By Ernest Greenwood.

Harper & Bros., New York. 250 pages. Price $2.50.

BEGINNING with the tales of fire as they are chronicled in myths, legends and the history of its uses down through the ages, Mr. Greenwood considers in this book the modern methods of using fuels and their relative merits in industry and home. He has collected a large amount of material on oil, gas and electric light and power and has been able to sketch the picture of the distribution of these agencies for their multitudes of present-day employments. "Automatic heat," he summarizes, "is the latest achievement of man in employing fire for his comfort and for industrial purposes."

Mr. Greenwood will be remembered as the author of "Aladdin, U. S. A.," published last year by Harper & Brothers also, which gave a very informative picture of the electric light and power industry and its contributions to civilization. While the book is written in an interesting style it is far from a light vein in which the author discusses the many subjects contained in "Prometheus, U. S. A." Wood is referred to as the first fuel and one of the bulwarks on which this country was built. Facts are given on the supply of wood now available and what is being done to assure a continuing supply for future generations, pointing out that wood is no longer to be considered as a major fuel.

In one chapter Mr. Greenwood writes, "* * * to coal goes the credit for building the very foundations of American industry and it will be a long, long time before it is entirely replaced by oil, water power or some synthetic fuel of the future.

"Without coal, our transportation system, the greatest in the world, would still be in its early stages of development. Coal was an important necessity in the smelting of iron so necessary for the rails and the equipment of our railroads. Wood was the only kind of fuel that was available in the early days; how far would our railroads have travelled if they had had to depend on wood? Coal was an absolute necessity to run the industries which eventually produced the machinery from which our water-power generating plants are built. Until very recently, coal has been the only efficient fuel for use in the 'central fire' in the cellar by means of which we have been able to heat our houses all over, from cellar to garret. Coal has produced the steel as well as the cement for our modern structures, whether office buildings or factories; almost the sum total of modern construction in America is nothing more or less than a monument to coal."

The gas industry is discussed, in some detail the author citing instances of the early discovery of gas and the difficulties that attended its commercial introduction in the last century in England and America. He includes a considerable amount of statistical information about the industry as it exists in this country today, pointing out that, as is the case with the light and power companies, gas companies necessarily are monopolies in the communities they serve. Other sections of this discussion deal with who owns the gas companies; coal as direct fuel and as raw material for making gas; coke and other by-products.

Most of the information that has been assembled in "Prometheus" on wood, gas and coal was designed to lead up to the petroleum industry. It is to this subject that Mr. Greenwood devotes the major part of his book. Not only does he tell about this feul *per se*, but he compares it with other fuels. Perhaps the most interesting chapter is "The Battle of the Fuels", with "What Price Heat" next in interest because of the controversies involved. It is here that the author deals with the efficient translation of fuels into heat and power and not only raises the many questions as to what sort of fuel is best suited for various needs but he also looks into the future and analyzes the possibilites that the next few years may bring to light.

"Prometheus, U. S. A." is a welcome addition to the ever-growing library of works that deal with Industrial America. —R. S.

Symposium on Electrical Advertising.

Serial Report, Electrical Advertising Committee, Commercial National Section, N.E. L.A. Publication No. 289-9, 130 pp., 54 illustrations, 4 tables. Price, $1.85; to members, $1.25.

THIS REPORT is based on the lectures delivered at the N. E. L. A. Electrical Advertising Courses held in March, 1928. It contains a great deal of valuable information for companies and individuals confronted with problems in electrical sign advertising.

The report consists of three parts. Part I deals with electrical sign advertising from the commercial point of view. Part II deals with technical matters, and Part III with accessories. —E. K.

Summary of Public Utility Commissioner Rules and Regulations for Electricity Meters.

Serial Report, Meter Committee, Engineering National Section, N.E.L.A. Publication No. 289-40, 20 pp. Price, 40 cents; to members, 25 cents.

RULES and regulations for electricity meters have been adopted in twenty-one States and the District of Columbia. In order to show clearly the similarities and differences in the service rules so far adopted by State commissions, abstracts of these rules have been segregated under appropriate headings in this report.

An attempt has been made to place the abstract of each rule under the heading best describing the subject matter of the rule. It is believed that all the rules of each commission have been abstracted and included in this report. To determine what each State's rules are, it is necessary only to read each under heading the abstract of the rules for the State in question. If no abstract is given, no rule has been adopted.

The purpose of the report is, obviously, to acquaint individuals interested in meters with the rules in effect throughout the country. It is hoped that Meter Committee members and other interested in these rules may take the necessary steps to eliminate some of the existing differences, and that ultimately the rules in all the States may become standardized.—E. K.

Electric Power Survey of Ohio, West Virginia and Kentucky.

By Power Survey Committee, East Central Division, N.E.L.A. 59 pages, with numerous illustrations, graphs and maps. Single copies, $1 each. Five or more, 50 cents each. Order from D. L. Gaskill, secretary. East Central Division, N.E.L.A., 603 Broadway, Greenville, S. C. To be reviewed next month.

Recent Serial Reports

Since the January issue of the N. E. L. A. BULLETIN, the following Serial Reports of N. E. L. A. Committees have been published:

		Price	To Members
	Electrical Advertising Committee		
289- 9	Symposium on Electrical Advertising.	$1.85	$1.25
	Electrical Apparatus Committee		
289-37	Progress in Generator Design & Practice	.45	.30
	Meter Committee		
289-39	Low Tension Metering Installations...	.15	.10
	(Meter Committee)		
289-40	Summary of Public Utility Commission Rules and Regulations for Electricity Meters	.40	.25
	Overhead Systems Committee		
289-16	Recommended Practices for Design & Construction of Rural Lines.......	.40	.25
	Prime Movers Committee		
289-28	Power Station Chemistry	.40	.25
	Rural Electric Service Committee		
289-12	Developing Electric Service for the Farm as Exemplified by the Organization and Methods of the Wisconsin Power & Light Co.	.25	.15

A more complete list appears on inside covers of this issue of the N. E. L. A. BULLETIN.

Orders should be addressed to the Sales and Order Department, National Electric Light Association, 420 Lexington Avenue, New York City.

Member Companies of the National Electric Light Association

(Continued from last month)

THE lists appended hereto present the names of the member companies of the National Electric Light Association as of Jan. 1, 1929, with the exception of Classes A and D, which appeared in the January issue. They are classified as follows:

Class A	(Light and power companies)	755
Class D	(Manufacturers)	416
Class F	(Associate companies)	402
Class H	(Foreign)	128
		1,701

In addition to its member companies, the Association has 18,944 individual members, classified thus:

Class B	(Employees of light and power companies)	15,192
Class C	(Invited members)	113
Class E	(Employees of manufacturer companies)	2,867
Class G	(Employees of associate companies)	710
Class I	(Foreign individual members)	62
		18,944

Total all classes of members, 20,645.

The names of the light and power companies invariably are listed at the principal place of production or distribution of energy. Where the general office of any company is located at some other point, the address of the general office is shown immediately following the name of the company.

Light and power companies (Class A) were listed last month, followed by companies or firms engaged in the manufacture of electrical apparatus or equipment for the production or use of electrical energy (Class D). Companies or firms of electrical jobbers, contractors, dealers, electrical or mechanical engineers, publishers, associations or others, corporations or individuals who are interested in advancing the use of electrical energy (Class F) are listed herewith followed by individuals or corporations not residents of North America engaged in the central station industry, or interested in advancing the use of electrical energy (Class H).

Associate Companies

(Class F)

"Class F members shall be companies or firms of electrical jobbers, contractors, dealers, electrical or mechanical engineers, publishers and associations—corporations or individuals—who are interested in advancing the use of electrical energy and are not engaged in its production or distribution."—*Constitution, Art. III, Sec. 7.*

Alabama

Birmingham—J. H. Taylor, Comm. of Public Safety.
(4th Avenue at 19th Street)

California

Emeryville—Garner Electric Manufacturing Company.
Los Angeles—Bent Concrete Pipe Company.
(419 Grosse Building)
R. G. Campbell Electric Company
(114 East Fourth Street)
Clapp & LaMoree
(1325 San Julian Street)
Detrick-Joslyn Company
(110 North Alameda Street)
Electrical Products Claude Neon, Inc.
(1122 Venice Boulevard)
Everhot Electric & Manufacturing Company
(116 Llewellyn Street)
Farnham & Cunningham
(307 South Hill Street)
Graham-Reynolds Electric Company
(300 East 3rd Street)
Jones-Lyman & Company, Inc.
(401 Bartlett Building)
Listenwalter & Gough, Inc.
(819-821 East 1st Street)
Marbelite Corporation of America
(3248 Long Beach Avenue)
Newbery Electric Corporation
(726 So. Olive Street)
Pacific States Electric Company
(385 East Second Street)
Pinson's Electric Service
(308 East 4th Street)
Reiman Wholesale Electric Company
(218-228 East 3rd Street)
Thor Pacific Company
(1017 South Grand Avenue)
H. H. Walker, Electragist
(1328 Venice Boulevard)

(Class F Members Continued)

Western Light & Fixture Company
(301 South Los Angeles Street)
Redlands—Barry Dibble.
Sacramento—J. C. Hobrecht Company.
(1020 J. Street)
San Francisco—Alexander and Lavenson.
(926 Howard Street)
Associated Oil Company (Sales Department, Industrial Lubricant Division)
(79 New Montgomery Street)
Baker-Joslyn Company
(490 Second Street)
Frank G. Baum
(1902 Hobart Building)
Constant Angle Arch Dam Company
(1202 Hobart Building)
The Electric Material Company, Inc.
(589 Howard Street)
Fobes Supply Company
(260 5th Street)
Garland-Affolter Engineering Corporation
(Rialto Building)
W. Wesley Hicks
(215 Rialto Building)
Hot-N-Kold Corporation
(949 Mission Street)
Joshua Hendy Iron Works
(200 Pine Street)
K. P. F. Electric Company
(855-859 Howard Street)
Kortick Manufacturing Company
(333 First Street)
Louis F. Leurey, Consulting Electrical Engineer
(58 Sutter Street)
Maydwell & Hartzell, Inc.
(158 11th Street)
C. C. Moore & Company
(Sheldon Building)
(First & Market Streets)
Pacific States Electric Company
(1201 Bryant Street)
Preferred Electric Company, Inc.
(681 Market Street)
Sandoval Sales Company
(115 Jessis Street)
G. M. Simonson, Consulting Engineer
(74 New Montgomery Street)
Taper Tube Pole Company of California
(479-81 Monadnock Building)
Thebo, Starr & Anderton, Inc.
(523 Sharon Building)
Garnett Young & Company
(390 Fourth Street)

Colorado

Denver—Mountain States Telephone & Telegraph Company.
(Administration Building, 800 14th Street)
Herbert S. Sands, Consulting Engineer
(1115 First National Bank Building)

(Class F Members Continued)

Connecticut

Hartford—Electric Transportation Company.
(380 Sheldon Street)
The Hartford Steam Boiler Inspection & Insurance Co.
(56 Prospect Street)
Putnam & Company
(6 Central Row)
New Haven—The Hessel & Hoppen Company.
(30-36 Crown Street)
Sidney Withington, Electrical Engineer
(New York, New Haven & Hartford R. R. Company)
Stamford—The F. A. Bartlett Tree Expert Company.
(P. O. Box 852, 45 Stage Street)
Waterbury—Tracy Smith, c/o Hugh L. Thompson. Consulting Engineer.
(P. O. Box 1033)

Delaware

Wilmington—J. C. Allen, Electrical Engineer.
(c/o Atlas Powder Company)
E. I. Du Pont De Nemours & Company
(Du Pont Building, Room 3113)

District of Columbia

Washington—A. R. Cheyney, Consulting Engineer. (P. O. Box 275)
(12th & Pennsylvania Avenue Station)
Chas. B. Hawley, Engineering Corporation
(1132 Munsey Building)
Francis R. Weller
(601 Mills Building)

Florida

Jacksonville—General Electric Supply Corporation.
(Union Terminal Warehouse)

Georgia

Atlanta—Charles G. Adsit.
(516 Grant Building)
Electrical South
(1020 Grant Building)
General Electric Supply Corporation
(172 Haynes St. S. W.)
Southern Power Journal
(1021 Grant Building)

(*Class F Members Continued*)

Illinois

Chicago—The American Appraisal Company.
(88 South Dearborn St.)
Bennett-Watts-Haywood Company
(Publishers Electric Light & Power)
(860 North Michigan Ave., Room 1722)
S. Morgan Bushnell
(Suite 2062, Builders Building)
(228 North LaSalle Street)
Central States General Electric Supply Company
(816-826 South Wells Street)
A. L. Drum & Company
(230 South Clark Street)
Electrical Trade Publishing Company
(824 Monadnock Block)
Frank F. Fowle & Company
(53 West Jackson Boulevard)
Freyn Engineering Company
(310 South Michigan Avenue)
L. F. Harza, Consulting Hydro-Electrical Engineer
(2122 Engineering Building)
Hoosier Engineering Company
(100 West Monroe Street)
Industrial Power
(608 South Dearborn Street)
Clarence G. Johnson, Consulting Engineer
(39 South LaSalle Street)
G. H. Knutson, Financial Engineer
(111 West Monroe Street)
Lucas & Luick, Engineers
(1554-231 South LaSalle St.)
James S. Mahan
(222 West Adams Street, Room 900)
McJunkin Advertising Company
(228 North LaSalle Street)
Neiler, Rich & Company
(431 South Dearborn Street)
Langdon Pearse
(910 South Michigan Avenue)
Pettengill, Incorporated
(1700 Prairie Avenue)
Power Plant Engineering
(53 West Jackson Boulevard)
Sargent & Lundy
(72 West Adams Street)
Burke Smith
(212 West Washington Street)
Spooner & Merrill, Inc.
(111 West Monroe Street)
Utilities Publication Company
(35 East Wacker Drive)
William E. Vogelback
(100 West Monroe Street)
James Walker, Consulting Engineer
(105 West Adams St.)
Arthur Young & Company
(105 South LaSalle Street)
Cicero—American Spiral Pipe Works.
(West 14th Street & South 48th Ave.)
Evanston—Bishop Publishing Company.
Peoria—American Water Utilities Corporation.
(207-11 Peoria Life Building)

Indiana

Indianapolis—Lake States General Electric Supply Company, Inc.
(326 West Georgia Street)

Iowa

Des Moines—Des Moines Gas Company.
(812 Sixth Avenue)

Kentucky

Maysville—Horace J. Cochran.
Paducah—Southern Pine Manufacturing Company.
(City National Bank Building)

Louisiana

Hammond—Henry A. Mentz, Consulting Engineer.
New Orleans—General Electric Supply Corporation.
(800 Constance Street)

Maryland

Baltimore—General Electric Supply Corporation.
(5-7-9 South Gay Street)
Wehr & Walden Engineers
(1602 Continental Building)

Massachusetts

Boston—Arthur H. Abbott, Inc.
(88 Broad Street)
H. K. Barrows, Consulting Engineer
(6 Beacon Street)
Beaudette & Graham Company
(915 Boylston Street)
Edward C. Brown Company
(220 Devonshire Street)
George H. Buckminster Company
(59 Oliver Street)
Coffin & Burr, Inc.
(60 State Street)
Doremus & Company
(20 Kilby Street)
Electric Refrigerator Company of New England
(788 Boylston Street)

(*Class F Members Continued*)

George W. Ellis Company, Inc.
(Statler Building)
(20 Providence Street)
General Electric Supply Corporation
(378 Stuart Street)
Edward A. Graustein, Engineer
(6 Beacon Street)
Hixon Electric Company
(22 Elkins Street)
Jackson & Moreland
(31 St. James Avenue)
J. W. Johnston
(19 Pearl Street)
Arthur S. Knight, Consultant
(84 State Street, Room 401)
Charles T. Main, Inc.
(201 Devonshire Street)
New England Telephone & Telegraph Company
(50 Oliver Street, Room 808)
Franklin A. Snow Company
(79 Milk Street)
George W. Stetson
Stets Company
(141 Milk Street)
Howard M. Turner, Consulting Engineer
(12 Pearl Street)
Vaughan Engineers
(44 School Street)
George H. Wahn Company
(69 High Street)
Wetmore-Savage Electric Supply Company
(76 Pearl St.)
Lowell—John A. Stevens.
(16 Shattuck Street)
Springfield—M. J. Daley & Company, Inc.
(1654 Main Street)
Fred T. Ley & Company, Inc.
(1215 Main Street)
Woburn—W. G. Stretton.
(12 Montvale Avenue)
Worcester—George N. Bailey, Engineer.
(c/o New England Power Construction Company)

Michigan

Detroit—Business News Publishing Company.
(550 Maccabees Building)
Campbell-Ewald Company
(General Motors Building)
Lake States General Electric Supply Company, Inc.
(415-419 East Congress Street)
Jackson—Fargo Engineering Company.
(147 South Mechanic Street)

Minnesota

Minneapolis—John A. Clark Electric Company.
(624 Baker Building)
W. B. Foshay Company
(Foshay Building)
Howard & Geeseka Company
(1008 Marquette Avenue)
Clarence H. Nelson (University of Minnesota) Northern White Cedar Association
(702 Lumber Exchange)
Northwest General Electric Supply Company
(227 South Fifth Street)
Page & Hill Company
(814 Plymouth Building)
T. M. Partridge Lumber Company
(731 Lumber Exchange)
Melvin J. Stevenson
(808 LaSalle Avenue)
St. Paul—Great Northern Electric Appliance Company
(145-147 East 5th Street)
Jobbers Supply Company
(781 North Prior Avenue)
Northwest General Electric Supply Company
(174 East Sixth Street)
Robert P. Payne
(296 MacAlester Avenue)

Missouri

Kansas City—Black & Veatch, Consulting Engineers
(Mutual Building)
Burns & McDonnell Engineering Company
(402 Interstate Building)
Mid-West General Electric Supply Company
(1411 Walnut Street)
Arthur L. Mullergren, Consulting Engineer
(770 Board of Trade Building)
The Charles L. Ward Company
(1229-31 Baltimore Avenue)
St. Louis—General Electric Supply Corporation.
(200 South Seventh Street)
H. C. Heink, Mechanical Engineer
(c/o Midwest Piping & Supply Company, Inc.)
(1450 South Second Street)
John Hunter, Mechanical Engineer
(805 Merchants Laclede Building

Montana

Butte—Butte Electric Supply Company.
(900 East Front Street)

(*Class F Members Continued*)

Nebraska

Omaha—Mid-West General Electric Supply Company.
(814 South 14th Street)

New Jersey

Atlantic City—Frank Shinnen (Chief Electrical Bureau of Atlantic City)
Camden—Charles S. Wright.
(2182 Federal Street)
East Orange—Charles A. Stanwick.
(33 Beech Street)
Jersey City—The M. W. Kellogg Company.
(Foot of Danforth Avenue)
Newark—Ellsworth Francisco.
(City Hall)
General Electric Supply Corporation
(52 Lafayette Street)
The Prudential Insurance Company of America
Public Service Production Company
(80 Park Place)
Trenton—M. M. Fleron & Son, Inc.
(113 North Broad Street)
Ventnor City—H. A. Davis Company.

New York

Albany—Charles J. Barrow, Consulting Engineer.
(50 State Street)
Buffalo—Remington Rand Business Service, Inc.
(465 Washington Street)
Seneca Vocational School
(666 East Delavan Avenue)
Deferiet—John E. A. Warner.
(P. O. Box No. 5)

New York City

Brooklyn—W. B. McVicker Company.
(295 Douglass Street)
Marvin Shiebler
(130 Clinton Street)
Manhattan—Ambursen Construction Company, Inc.
(Grand Central Terminal)
American Telephone & Telegraph Company
(195 Broadway)
G. O. Apikian
(180 East 28th Street)
Edward E. Ashley, Jr.
(393 Seventh Avenue)
Harry Barker, Consulting Engineer
(11 Park Place)
Robert T. Battle, Electrical Engineer
(254-6 West 31st Street)
Henry D. Behr, Electrical Engineer
(Publix Theatres Corporation, Paramount Building)
James H. Betts, Electrical Engineer,
(International Neon Corporation)
(41 East 42nd Street)
Boiler & Engineering Insurance Service Bureau
(One Park Avenue)
Bonbright & Company, Inc.
(25 Nassau Street)
Bowser Service Corporation
(225 Fifth Avenue)
W. H. Braun
(115 Broadway)
H. W. Brooks, Consulting Engineer
Metropolitan Tower, Room 316, One Madison Avenue)
Brown Crosby & Company, Inc.
(96 Wall Street)
Lilian Cassels
(47 West 42nd Street)
The Central Station
(15 West 55th Street)
E. J. Cheney
(61 Broadway)
Columbia Casualty Company
(One Park Avenue)
Consolidated Telegraph & Electrical Subway Company
(54 Lafayette Street)
*Hugh L. Cooper & Company
(101 Park Avenue)
R. W. Cramer & Company, Inc.
(136 Liberty Street)
Dela Croix & Monroe
(225 Fifth Avenue)
Duparquet Huot & Moneuse Company
(108 West 22nd Street)
Electric Meter Corporation
(116 East 19th Street)
Electrical Goods
(239 West 39th Street)
Electrical Record
(461 Eighth Avenue)
Electrical Testing Laboratories
(80th Street & East End Avenue)
Electrical World
(10th Avenue & 36th Street)
Electricity on the Farm
(225 West 34th Street)
The Financial World
(53 Park Place)
B. C. Forbes Publishing Company, Inc.
(120 5th Avenue)

(Class F Members Continued)

Ford, Bacon & Davis, Inc.
(39 Broadway)
The Foundation Company
(120 Liberty Street)
K. G. Frank
(75 West Street)
General Electric Supply Corporation
(585-591 Hudson Street)
G. M. Gest
(1836 Woolworth Building)
Goodwin Morton & Badrian, Inc.
(522 Fifth Avenue)
Guaranty Company of New York
(140 Broadway)
Louis Harding, Secretary
(Central Traction & Lighting Bureau, 1 Liberty Street)
Harris Forbes & Company
(Pine & William Streets)
Warren Hilleary, Royal Indemnity Company
(150 William Street)
Paul James Howe
(195 Broadway)
Lee P. Hynes, Electrical Engineer
(80 Church Street)
Industrial Engineering
(10th Avenue & 36th Street)
International Standard Electric Corporation
(67 Broad Street)
Ives & Davidson
(15 Park Row)
Kaiser, Muller & Davies
(101 Park Avenue)
Jeremiah J. Kennedy
(52 Broadway)
William S. Leffler, Consulting Engineer.
(Salmon Towers 11 West 42nd Street, 24th floor)
Charles O. Lenz, Consulting Engineer
(33 Rector Street, 12th floor)
Lighting Fixtures & Lighting
(215 4th Avenue)
Ray D. Lillibridge, Incorporated
(8 West 40th Street)
McGraw-Hill Publishing Company, Inc.
(10th Avenue & 36th Street)
Harvey E. Mole
(90 West Street)
Murray & Flood
(369 Lexington Avenue)
Harry Alvin Kidder, Superintendent of Motive Power (Interborough Rapid Transit Company)
(600 West 59th Street)
Thomas E. Murray, Inc.
(55 Duane Street)
David Moffat Myers, Consulting Engineer
(One Madison Avenue)
National Railway Appliance Company
(420 Lexington Avenue)
New York Journal of Commerce
(46 Barclay Street)
The New York Service Company
(141 East 29th Street)
Norton Bird & Whitman
(15 Broad Street)
The Ocean Accident & Guarantee Corporation, Ltd.
(One Park Avenue)
Farley Osgood, Consulting Engineer
(31 Nassau Street)
Ernest V. Pannell
(c/o The British Aluminum Company, Ltd. 165 Broadway, Room 1810)
Parsons Klapp Brincherhoff & Douglas
(84 Pine Street)
E. L. Phillips & Company
(50 Church Street)
Porter & Ross, Inc.
(30 Church Street)
Charles S. Reed, Consulting Engineer
(74 Trinity Place)
Herbert B. Reynolds
(600 West 59th Street)
Dwight P. Robinson & Company, Inc.
(125 East 46th Street)
E. H. Rollins & Sons
(44 Wall Street)
Sales Engineering Service Corporation
(42 Broadway)
Sanderson & Porter
(52 William Street)
E. Y. Sayer Engineering Corporation
(Knickerbocker Building)
(42nd St. & Broadway)
Semet-Solvay Engineering Corporation
(40 Rector Street)
Sparklets, Incorporated
(19 West 44th Street)
Stevens & Wood, Incorporated
(20 Pine Street)
Trojan Engineering Corporation
(40 Exchange Place)
Frederick A. Waldron, Consulting Engineer
(37 Wall Street)
Don M. Welsh
(Room 202 I. R. T. Company, Administration Building, 2545-7th Avenue)
P. H. Whiting & Company, Inc.
(72 Wall Street)
Julian E. Woodwell
(501 Fifth Avenue)

(Class F Members Continued)

Long Island City—Austin & Moore, Inc.
(87 Wilbur Avenue)
Niagara Falls—Charles C. Egbert.
(Gluck Building)
North Tonawanda—American District Steam Company.
Rochester—Kelly-Read & Company, Inc.
(508 St. Paul Street)

North Carolina

Charlotte—Mees & Mees, Inc. Engineers.
(616 Johnston Building)

North Dakota

Bismarck—C. C. Larsen.
(First Guaranty Bank Building)

Ohio

Cincinnati—The Beltzhoover Electric Company.
(North East Corner of Fourth & Plum Streets)
Lake States General Electric Supply Company, Inc.
(215 West Third Street)
Paul Stewart and Company
(First National Bank Bldg.)
Cleveland—Lawrence D. Bale.
(The Cleveland Railway Company)
(733 Hanna Building)
The Collier Construction Company
(500 East 102nd St.)
Continental Shares, Inc.
(520 Cuyahoga Building)
A. D. Fishel Company
(942 Engineers Building)
Fuller & Smith
(1501 Euclid Avenue)
Lakes States General Electric Supply Company, Inc.
(Chester Avenue at Eighteenth Street)
Line Equipment Sales Company
(1241 East 45th Street)
The Rae Advertising Company
(Rockefeller Building)
Columbus—Lake States General Electric Supply Company, Inc.
(146-148 North Third Street)
Snook, Martin & Company, Consulting Engineers
(40 West Gay Street)
Samuel S. Wyer
(1014 Hartman Building)
Kent—The Davey Tree Expert Company.
(South Water Street)
Toledo—The Froehlich & Emery Engineering Company
(410 Second National Bank Building)
Lake States General Electric Supply Company, Inc.
(28-32 Saint Clair Street)

Oklahoma

Oklahoma City—Southwest General Electric Supply Company.
(127-129 East California Street)

Oregon

Hood River—Frank O. Berry.
Portland—Pacific States Electric Company.
(61-67 Fifth Street, North)

Pennsylvania

Brookville—Peter F. Loftus, Consulting Electrical Engineer.
Kennett Square—Russell P. Brewer, Maintenance Engineer.
(Longwood Farms)
Palmyra—Harry B. Nye.
(17 West Main Street)
Philadelphia—The Bell Telephone Company of Pennsylvania.
(1835 Arch Street)
F. G. Corbus
(2409 West Westmoreland Street)
Day & Zimmermann, Engineering & Construction Company
(112 North Broad Street)
Electric Time Corporation
(133 South 12th Street)
C. H. Geist Securities Corporation
(1622 Packard Building)
General Electric Supply Corporation
(37-39 North 7th Street)
Harrison & Company
(1824 Land Title Building)
E. E. Hedler
(250 North 11th Street)
Larner Engineering Company.
(Atlantic Building)
Mellon, Taylor, Hendrickson, Inc.
(225 South Fifteenth Street)
W. H. Newbold's Son & Company
(1517 Locust Street)
Arthur Perry & Company
(1500 Walnut Street Building)
The Rumsey Electric Company
(1007 Arch Street)
Scofield Engineering Company
(1324 Commercial Trust Building)

(Class F Members Continued)

The U. G. I. Contracting Company
(1401 Arch Street)
Welsbach Electric Street Lighting Company
(261 North Broad Street, 4th floor)
Pittsburgh—David Boyd-Smith.
(800 Union Trust Building)
The Electric Journal
(1205 Keenan Building)
Electric League of Pittsburgh
(318 Westinghouse Building)
General Electric Supply Corporation
(420-422 Duquesne Way)
The L. B. Michaels Company
(529 Fulton Building)
Henry N. Muller Company
(2218 First National Bank Bldg.)
National Fireproofing Company
(Fulton Building)
Pittsburgh Testing Laboratory
(P. O. Box 1115)
Maurice R. Scharff, Consulting Engineer
(Farmers Bank Building)
E. S. Stickle Company
(934 Union Trust Building)
H. O. Swoboda Incorporated
(3400 Forbes Street)
York—Floorola Sales Company of America, Inc.
(480 Salem Avenue)

Rhode Island

Providence—Jenks & Ballou.
(2600 Industrial Trust Building)
Union Electric Supply Company
(60 Pine Street)

South Carolina

Greenville—J. E. Sirrine & Company.

Tennessee

Chattanooga—General Electric Supply Corporation.
(429 Broad Street)
Memphis—General Electric Supply Corporation.
(16 South Lauderdale)

Texas

Dallas—Southwest General Electric Supply Company.
(1801 North Lamar Street)
Houston—Southwest General Electric Supply Company.
(5 North Milam Street)
San Antonio—M. L. Diver, Consulting Engineer.
(P. O. Box 1073)

Utah

Salt Lake City—Capital Electric Company.
(P. O. Box 1877)

Virginia

Clifton Forge—A. H. Grimsley.
(425 Alleghany Street)
Coleman Falls—Spottswood C. Foster.
Norfolk—Woodhouse Electric Company, Inc.
(288 Court Street)
Richmond—General Electric Supply Corporation.
(Fourth & Canal Streets)
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(Department of Public Utilities)
(Room 317, City Hall)

Washington

Seattle—Eicher & Bratt.
(Colman Building)
Pacific States Electric Company
(570 First Avenue, South)
Washington Surveying and Rating Bureau
(1100 Alaska Building)
Tacoma—Homer O. Blair, Consulting Engineer.
(1104 Pacific Avenue)

Wisconsin

Milwaukee—The Electric Meter Engineering Company.
(3712 Vliet Street)
Ed. Schuster and Company, Inc.
(3rd & Garfield, Servel Department)

Territorial Possessions

Porto Rico

Ponce—Burton E. Anderson, Electrical Engineer.
(Box 8)

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(718 Boulevard, North West)

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(Department Trade & Commerce, West Block)
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Shawinigan Chemicals, Limited (Chemical Division)
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The Wabasso Cotton Company, Limited.
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(448 Landsdowne Avenue)

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(Class H)

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ASIA

China

Canton—Kwang Tung Electric Supply Company, Ltd.
Macao—Macao Electric Lighting Company, Ltd.
(Rua Central)

Federated Malay States

Taiping, Perak—Ernest F. Stephenson.
(Electrical Inspector's Office)

India

Bombay—The Tata Hydro-Electric Power Supply Company, Ltd.
(Bombay House, Bruce Street, Fort)
Calcutta—The Calcutta Tramways Company, Ltd.
(7 Church Lane)

Japan

Kobe—S. Hirota, President.
(Kobe Technical College)
Mitsubishi Electrical Engineering Company, Ltd.
(Wadasaki-Cho)
Kyoto City—Kyoto Electric Light Company.
Osaka—The Nippon Electric Power Company, Ltd.
(Osaka Building, Soze-cho, Kitaku)
Sanyo Chuo Kydro Electric Company
(No. 48 4-chome Kitahama Higashi-Ku)
Ujigawa Electric Company, Ltd.
Osaka City—(Sonezaki Kita-Ku)
Tokio—Daido Denryoku Kabushiki Kaisha
(Tokio Kaijo Building—Marunouchi)
(Jiro Masuda, Vice-President)
Tokyo—The Electric Association of Japan.
(1-chome 5 Yuraku-cho Marunouchi)
Electrical Exploitation Bureau D of Communications
(Teishinsho Denkikyoku Gyomuka)
The English Electric Company, Ltd.
(Yuraku Building, Marunouchi)
Keiji Ito
(Marunouchi Building, Room 682)
Tokiwo Kobayakawa
(care of Kyosan & Company)
(4th Floor, Japan Ind. Bank)
(Marunouchi)
Ryotaro Mitsuda, Doctor of Engineering
(Electro-Technical Laboratory)
Hide Mori
(Bureau of Electric Power)
(Ministry of Communications)
Shibaura Engineering Works
(Shibaura)

(Class H Members Continued)

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(Shinyetsu Electric Power Company)
(Care of Osaka Building, Marunouchi)
Toho Denryoku Kabushiki Kaisha
(Kaijo Building)
Tokyo Electric Light Company
(Sakurada-Hongo-cho, Shibaku)
Manchuria—S. Haraguchi.
(The South Manchuria Electric Company, Ltd.—Dairen)
South Manchuria—Oiso Yoshiwo, Power Engineer.
(58 Kushunokicho—Dairen)
Yokohama—The Furukawa Electric Company, Ltd.
(Nishi-Hiranuma)

Java

Bandoeng—Dienst Voor Waterkracht En Electriciteit.

Siam

Bangkok—The Siam Electric Corporation, Ltd.

AUSTRALIA

New South Wales

Sydney—Australian Commonwealth Engineering Standards Association.
(Macleay House, 16 College Street)
George Alfred Julius
(Culwalla Chambers, Castlereagh Street)
Brisbane—City Electric Light Company, Ltd.
(Box 403, F. G. P. O.)

South Australia

Adelaide—The Adelaide Electric Supply Company.
(Grenfell Street, East)
Mechanical Supplies, Ltd.
(69 Grenfell Street)
Port Pirie—The Broken Hill Associated Smelters Property, Ltd.

Victoria

Melbourne—Australian General Electric Company.
(P. O. Box 538)
The Edison Swan Electric Company, Ltd.
(368 Little Collins Street)
Melbourne Electric Supply Company, Ltd.
(19 Queen Street)

New Zealand

Ashburton—Herbert George Kemp
(P. O. Box 40)
Christchurch—J. R. Templin, C. E. Engineer.
(P. O. Box 420)
Dnnedin—Messrs Turnbull & Jones, Ltd., Electrical Engineers.
(78-80 Stuart Street, P. O. Box 362)
Lower Hutt—Ernest Bickerstaff.
(P. O. Box 13)
Wellington—The National Electrical & Engineering Company, Ltd.
(P. O. Box 1055)

Tasmania

Hobart—Electrolytic Zinc Company of Australasia, Ltd.
(Box AA-B)

Bermuda

Hamilton—The Bermuda Electric Light, Power & Traction Co.
(Serpentine Road)

CENTRAL AMERICA

El Salvador

San Salvador—Cia. de Alumbrado Elec. de San Salvador.
(Apartado No. 186)

EUROPE

Czecho-Slovakia

Prerov — Stredomoravska Elektrarny Akciova Spolecnost.

England

Birmingham—Belliss and Morcam, Ltd.
(Ledsam Street Works)
Robert Orsettich
(Care General Electric Company, Limited Witton Works)
County Durham—Synthetic Ammonia & Nitrates, Ltd.
(Billingham Nr. Stockton-on-Tees)
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(Research Department, Gravesend)
Lancashire—British Insulated Cables, Ltd.
(Prescot)

(*Class H Members Continued*)

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(36 Park Place)

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(36 and 38 Kingsway, W. C.)
The British Electrical Development Association, Inc.
(15 Savoy Street, Strand W. C. 2)
David Brownlie
(46 Grange Road, Ealing W. 5)
Central Electricity Board
(1 Charing Cross W. C. 2)
Dewrance & Company
(165 Great Dover Street)
Electricity Commission
(Savoy Court Strand W. C. 2)
The Foundation Company, Ltd. (Aldwych House)
(Aldwych W. C. 2)
Imperial Chemical Industries, Ltd.
(Nobel House, Buckingham Gate S. W. 1)
International Combustion, Ltd.
(Africa House Kingsway)
Kennedy & Donkin
(Broadway Court, Westminster)
The London Electric Supply Corporation, Ltd.
(25 A Cockspur Street, S. W. 1)
London Power Company, Ltd., Engineering Department
(Horseferry Road, S. W. 1)
Merz & McLellan
(32 Victoria Street, S. W. 1)
The Metropolitan Electric Supply Company, Ltd.
(16 Stratford Place, W. 1)
The North Metropolitan Electric Power Supply Company
(Broadway Buildings, Broadway, Westminster S. W. 1)
H. F. Parshall, Esq.
(Salisbury House, London Wall, E. C. 2)
Standen Leonard Pearce, c/o London Power Company, Ltd., Engineering Department
(Horseferry Road, Westminster S. W. 1)
W. M. Selvey, Consulting Engineer
(64 Victoria Street)
Underfeed Stoker Company, Ltd.
(Aldwych House, Aldwych, W. C. 2)
West Gloucestershire Power Company, Ltd.
(Stafford House, 14-20 King William Street)
J. G. White & Company, Ltd.
(9 Cloak Lane, Cannon Street E. C. 4)
C. T. Wilkinson
(Amberley House, Norfolk Street, Strand W. C. 2)
Worthington-Simpson, Ltd.
(Queen's House Kingsway, W. C. 2)

Manchester—Metropolitan Vickers Electrical Company, Ltd.
(Trafford Park)

Newcastle-Upon-Tyne—Newcastle-Upon-Tyne Electric Supply Company, Ltd.
(Carliol House)

France

Belfort—Societe Alsacienne De Constructions Mecaniques.

Paris—Cie Continentale pour la Fabrication des Compteurs et Autres Appareils
(Rue d'Astorg 17)
Ernest F. H. Mercier
(8 Rue de Messine)

Strasbourg—Electricite De Strasbourg
(1 Rue de 22 Novembre a)

(*Class H Members Continued*)

Germany

Berlin—Allgemeine Elektricitats-Gesellschaft. Fabriken Oberleitung Abt AJ
(Jnvalidenstr 110, N. 4 Prussia)
Gesellschaft fur elektrische
(Unternehmungen - Dorotheenstrasse 36, N. W. 7)
Osram G. mb H. Kommanditgesellschaft Abteilungfuer-Lichtwirtschaft
(Ehrenbergstrasse 11-14, Prussia)

Holland

Amsterdam — Algemeene Nederlandsch-Indische Electriciteit Maatschappij
(17 Nieuwe Spiegelstraat)

Italy

Milano—Carlo Moriondi, Consulting Engineer
(Via Pergolesi 19)
Turin—Societa Idroelettrica Piemonte
(Via Arsenale)

Norway

Oslo—Nissen & Von Krogh, Kronprinsensgade.
Norske Elektricitetsverkers Forening, Kronprinsensgade 19

Sunndalsora—A. S. Aura.

Spain

Barcelona—Ebro Irrigation Company
(Plaza Cataluna 2)

Madrid—Jose Pla Armero, Consulting Engineer
(Goya 34-3 dr.)

Valencia—Sociedad Anonima de Fuerzas Electricas
(P. O. Box, Apartado 174)

Sweden

Stockholm — Kungl Vattenfallsstyrelsen Kraftverksbyran
(Bergeringsgatan 45)
Svenska Elektriseicitetsverksforeningen
(Tulegatan 13)

Switzerland

Bern—Bernische Kraftwerke A. G.
(Viktoriaplatz 2)

Zug—Landis & Gyr, S. A.

Turkey

Constantlnople—Turkish Anonyme Electrical Society of Constantinople.

Mexico

Mexico, D. F.—Mr. Carlos Macias
(8a Calle Zarco 59)

Mexico City—Rodolfo C. Rodriquez, Chief Electrical Engineer
(National Railways of Mexico-Colonia Station)

SOUTH AMERICA

Argentine Republic

Buenos Aires—Compania Anglo-Argentina de Electricidad
(188 Esmeralda)
Compania Argentina De Electricidad
(Calle Balcarce 184)
Cia Hispano Americana De Electricidad
(Balcarce 184)

(*Class H Members Continued*)

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(Calle Rivera Indarte 155)
Rios—Compania Luz Y Fuerza De Parana-Parana Entra.
Santa Fe—Compania Argentina De Tramways Y Fuerza, Lda.

Bolivia

La Paz—The Bolivian Power Company, Ltd.
(No. 56 Sucre Street)

Brazil

Bahia—Cia Lin ha Circular De Carris Da Bahia Largo do.
Plano Inclinado Goncalves No. 30.
Para—Para Electric Railway & Lighting Company, Ltd.
(Caixa 29)
Pernambuco—Pernambuco Tramways & Power Company, Ltd.
(Caixa 282)
Rio De Janeiro—Cia Brasileira De Energia Electrica
(Avenida Rio Branco No. 9)
Emprezas Electricas Brasileiras, S. A.
(Room 226, Casa Maua, Avenida Rio Branco, 9)
Sao Paulo—Cia de Forca e Luz de Jaboticabal
(Travessa do Commercio No. 9)
Cia Paulista De Forca E Luz
(Travessa do Commercio 9, 4 andar)
Empreza Forca E Luz De Ribeirao Preto
(Caixa 2961)
Empreza Forca e Luz do Jahu
(Travessa do Commercio No. 9)
Victoria, Espirito Santo—Cia Central Brasileira De Forca Elec.
(P. O. Box 3838)
Rio De Janeiro—The Rio de Janeiro Ty. Light & Power Company, Ltd.
Sao Paulo—Sao Paulo Tramway Light & Power Company.

Chile

Antofagasta—Cia Sud Americana de Servicios Publicos
(Casilla No. 98)
Santiago—Companies Chilena De Electricidad. Limitada
(Casilla 1557)

Ecuador

Guayaquil—Empresa Electrica del Ecuador, Inc.
Quito—The Quito Electric Light & Power Company
(Apartado No. 82)

Uruguay

Montevideo—S. Masson, Ing Jefe de las Usinas Electricas Del Estado.

Venezuela

Maracaibo—Venezuela Power Company, Ltd.
(Avenida Industria)

WEST INDIES

Cuba

Havana—Cia Cubana De Electricidad
(Monte No. 1)
Havana Central Railroad Company
(Apartado 450)

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Kingston—Jamaica Public Service Company, Ltd.

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The attention of all concerned is invited to the list of N. E. L. A. publications which appears on pages 4 and 5 of this issue.

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A. W. ROBERTSON, Westinghouse Electric & Manufacturing Co., New York, N. Y.

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OWEN D. YOUNG, General Electric Co., New York, N. Y.

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JOHN F. GILCHRIST, Commonwealth Edison Co., Chicago, Ill.

T. A. KENNEY, Allied Power & Light Corp., New York, N. Y.

GUY W. TALBOT, Pacific Power & Light Co., Portland, Ore.

GEOGRAPHIC DIVISIONS STATE ASSOCIATIONS

CANADIAN DIVISION

(*Entire Dominion of Canada*)

Canadian Electrical Association

President, P. S. GREGORY, The Shawinigan Water & Power Co., Montreal, Can.; *Secretary*, H. M. LYSTER, Room 712, Power Bldg., Montreal, Can.

(*This Division Has No State [Provincial] Section*)

*EASTERN DIVISION

(*New Jersey, New York, Pennsylvania*)

President, F. R. PHILLIPS, Duquesne Light Co., Pittsburgh, Pa.; *Managing Director*, A. B. MILLAR, Telegraph Bldg., Harrisburg, Pa.

Empire State Gas and Electric Association

President, CHARLES S. RUFFNER, Mohawk-Hudson Power Corp., Albany, N. Y.; *Secretary*, CHARLES H. B. CHAPIN, 5618 Grand Central Terminal Bldg., New York, N. Y.

New Jersey Electric Association

President, C. H. HOWELL, Atlantic City Electric Co., Atlantic City, N. J.; *Secretary*, S. F. DELANY, Atlantic City Electric Co., Atlantic City, N. J.

Pennsylvania Electric Association

President, F. R. PHILLIPS, Duquesne Light Co., Pittsburgh, Pa.; *Managing Director*, A. B. MILLAR, Telegraph Bldg., Harrisburg, Pa.

EAST CENTRAL DIVISION

(*Kentucky, Ohio, West Virginia*)

President, C. S. MACCALLA, Pennsylvania-Ohio Power & Light Co., Youngstown, Ohio; *Secretary-Treasurer*, D. L. GASKILL, 603½ Broadway, Greenville, Ohio.

Kentucky Association of Public Utilities

President, SAMUEL RIDDLE, Louisville Railway Co., Louisville, Ky.; *Secretary*, E. F. KELLY, Louisville Railway Co., Louisville, Ky.

Public Utilities Association of West Virginia

President, A. C. SPURR, Wheeling Traction Co., Wheeling, W. Va.; *Secretary*, A. BLISS MCCRUM, Box 1483, Charleston, W. Va.

GREAT LAKES DIVISION

(*Illinois, Indiana, Michigan, Wisconsin*)

President, J. E. JOHNSON, Illinois Power & Light Corp., Chicago, Ill.; *Secretary*, TOM C. POLK, 910 Marquette Bldg., Chicago, Ill.

Illinois State Electric Association

President, JULIUS L. HECHT, Public Service Co. of Northern Illinois, Chicago, Ill.; *Secretary-Treasurer*, GEORGE W. SCHWANER, 205 Illinois Mine Workers Bldg., Springfield, Ill.

Indiana Electric Light Association

President, NORMAN A. PERRY, Indianapolis Power & Light Co., Indianapolis, Ind;. *Secretary-Treasurer*, WILLIAM STOKES, 1548 Consolidated Bldg., Indianapolis, Ind.

Michigan Electric Light Association Section

President, HOWARD PETT, Consumers Power Co., Jackson, Mich.; *Secretary-Treasurer*, HERBERT SYLVESTER, The Detroit Edison Co., Ann Arbor, Mich.

Wisconsin Utilities Association

President, C. R. PHENICIE, Wisconsin Public Service Corp., Green Bay, Wis.; *Executive Secretary*, JOHN N. CADBY, Room 203, University Bldg., 432 Broadway, Milwaukee, Wis.

*MIDDLE ATLANTIC DIVISION

(*To Consist of Delaware, District of Columbia, Maryland, Virginia*)

Maryland Utilities Association

President, H. T. CONNOLLY, Washington, Baltimore & Annapolis Electric Railroad Company, Baltimore, Md.; *Secretary*, D. E. KINNEAR, United Railways & Electric Company, Baltimore, Md.

Public Utilities Association of Virginia

President, A. W. HIGGINS, Virginia Public Service Co., Charlottesville, Va.; *Secretary*, A. B. TUNIS, 301 East Grace Street, Richmond, Va.

MIDDLE WEST DIVISION

(Iowa, Kansas, Missouri, Nebraska)

President, RALPH T. SMALLEY, Kansas Electric Power Co., Lawrence, Kan.; *Managing Director,* THORNE BROWNE, 1527 Sharp Bldg., Lincoln, Neb.

Iowa Section

President, C. S. MACY, Iowa Power & Light Co., Adel, Iowa; *Secretary-Treasurer,* H. E. WEEKS, Tri-City Railway & Light Co., Davenport, Iowa.

Kansas Section

President, FRANK M. STONE, Kansas Utilities Co., Fort Scott, Kan.; *Secretary,* H. LEE JONES, 820 Kansas Avenue, Topeka, Kan.

Missouri Association of Public Utilities

President, A. E. REYNOLDS, Springfield Gas & Electric Co., Springfield, Mo.; *Secretary-Treasurer,* F. D. BEARDSLEE, 315 North Twelfth Street, St. Louis, Mo.

Nebraska Section

President, C. W. AMIDON, Central Power Co., Grand Island, Neb.; *Managing Director,* THORNE BROWNE, 1527 Sharp Bldg., Lincoln, Neb.

NEW ENGLAND DIVISION

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)

President, IRVIN W. DAY, The Connecticut Light & Power Co., Waterbury, Conn.; *Secretary,* MISS O. A. BURSIEL, Room 1113 Statler Bldg., 20 Providence Street, Boston, Mass.

(This Division Has No State Sections)

NORTH CENTRAL DIVISION

(Minnesota, North Dakota, South Dakota)

North Central Electric Association

President, L. M. PHARIS, Minnesota Power & Light Co., Duluth, Minn.; *Secretary,* JOHN W. LAPHAM, 803-804 Plymouth Bldg., Minneapolis, Minn.

(This Division Has No State Sections)

NORTHWEST DIVISION

(Alaska, Idaho, Montana, Oregon, Utah, Washington)

Northwest Electric Light and Power Association

President, R. M. BOYKIN, Pudget Sound Power & Light Co., Seattle, Wash.; *Secretary,* BERKELEY SNOW, Room 1206, Spaulding Bldg., Portland, Ore.

(This Division Has No State Sections)

PACIFIC COAST DIVISION

(Arizona, California, Hawaii, Nevada, Philippine Islands)

Pacific Coast Electrical Association

President, PAUL M. DOWNING, Pacific Gas & Electric Co., San Francisco, Cal.; *Secretary,* SAMUEL H. TAYLOR, Suite 729-730, 447 Sutter Street, San Francisco, Cal.

Arizona Utilities Association

President, M. A. POOLER, Tucson Gas, Electric Light & Power Co., Tucson, Ariz.; *Secretary,* L. C. MCCULLOUGH, 134 South Central Avenue, Phoenix, Ariz.

ROCKY MOUNTAIN DIVISION

(Colorado, New Mexico, Wyoming)

President, CLARE N. STANNARD, Public Service Co. of Colorado, Denver, Colo.; *Secretary,* O. A. WELLER, Public Service Co. of Colorado, Denver, Colo.

The Colorado Utilities Association

President, V. L. BOARD, Public Service Co. of Colo., Denver, Colo.; *Secretary,* O. A. WELLER, Public Service Co. of Colo., Denver, Colo.

New Mexico Utilities Association

President, W. W. NIELSEN, New Mexico Power Co., Santa Fe, N. M.; *Secretary-Treasurer,* BERNARD L. WILES, Albuquerque Gas & Electric Co., Albuquerque, N. M.

Wyoming Utilities Association

President, W. D. JOHNSTONE, Mountain States Power Co., Casper, Wyo.; *Secretary,* F. A. PROBST, Mountain States Telephone & Telegraph Co., Casper, Wyo.

SOUTHEASTERN DIVISION

(Alabama, Cuba, Florida, Georgia, North Carolina, South Carolina, Tennessee, Porto Rico)

President, C. A. COLLIER, Georgia Power Co., Atlanta, Ga.; *Secretary,* C. M. KILIAN, 207-8 Bona Allen Bldg., Atlanta, Ga.

SOUTHWESTERN DIVISION

(Arkansas, Louisiana, Mississippi, Oklahoma, Texas)

President, J. G. HOLTZCLAW, Gulf States Utilities Co., Beaumont, Tex.; *Secretary,* S. J. BALLINGER, San Antonio Public Service Co., San Antonio, Tex.

Arkansas Utilities Association

President, W. E. BANN, Southwestern Gas & Electric Co., Texarkana, Tex.; *Secretary,* R. I. BROWN, Arkansas Central Power Co., Little Rock, Ark.

Mississippi Electric League

President, A. H. JONES, Jones-Johnson Co., McComb, Miss.; *Secretary,* A. R. RIDDICK, A. G. Riddick, Inc., Jackson, Miss.

Oklahoma Utilities Association

President, L. W. SCHERER, United Telephone Corp., Watonga, Okla.; *Secretary,* EDWARD F. MCKAY, 1020 Petroleum Bldg., Oklahoma City, Okla.

Southwestern Public Service Association

President, W. H. BURKE, Stone & Webster, Inc., Houston, Tex.; *Secretary,* E. N. WILLIS, 403 Slaughter Bldg., Dallas, Tex.

*Note: This Division is in Process of Formation.

SECTIONS, BUREAUS AND COMMITTEES

Chairmen's names only listed here

SPECIAL NATIONAL COMMITTEES

Advertising Committee—FRANK LEROY BLANCHARD, Henry L. Doherty & Co., New York, N. Y.

Charles A. Coffin Prize Committee—P. S. ARKWRIGHT, Georgia Power Co., Atlanta, Ga.

Codes and Standards Committee—IRVIN W. DAY, The Connecticut Light & Power Co., Waterbury, Conn.

Constitution and By-Laws Committee—R. F. PACK, Northern States Power Co., Minneapolis, Minn.

Electrification of Steam Railroads Committee—BRITTON I. BUDD, Public Service Co. of Northern Illinois, Chicago, Ill.

Exhibition Committee—E. W. GOLDSCHMIDT, Wagner Electric Corp., New York, N. Y.

Finance Committee—SIDNEY Z. MITCHELL, Electric Bond & Share Co., New York, N. Y.

Lamp Committee—FRANK W. SMITH, The United Electric Light & Power Co., New York, N. Y.

Prize Awards Committee—W. H. ONKEN, JR., *Electrical World,* New York, N. Y.

Public Policy Committee—R. H. BALLARD, Southern California Edison Co., Los Angeles, Cal.

Rate Research Committee—L. R. NASH, Stone & Webster, Inc., Boston, Mass.

Water Power Development Committee—PAUL A. SCHOELLKOPF, The Niagara Falls Power Co., Niagara Falls, N. Y.

Wiring Policy Committee—J. E. DAVIDSON, Nebraska Power Co., Omaha, Neb.

GENERAL NATIONAL COMMITTEES

*Civic Development Committee—JOHN B. REYNOLDS, Middle West Utilities Co., Chicago, Ill.

*Educational Committee—FRED R. JENKINS, Commonwealth Edison Co., Chicago, Ill.

*Insurance Committee—W. H. SAWYER, Allied Power & Light Co., New York, N. Y.

*Membership Committee—HOWARD K. MOHR, The Philadelphia Electric Co., Philadelphia, Pa.

*Rural Electric Service Committee—CHARLES F. STUART, Northern States Power Co., Minneapolis, Minn.

ACCOUNTING NATIONAL SECTION

*Section's Executive Committee—J. F. FORD, The Philadelphia Electric Co., Philadelphia, Pa.

Budget Committee—B. S. RODEY, JR., The United Electric Light & Power Co., New York, N. Y.

*Classification of Accounts Committee—H. C. HASBROUCK, H. C. Hopson & Co., New York, N. Y.

Corporate Finance Committee—O. E. MCCORMICK, Middle West Utilities Co., Chicago, Ill.

*Customers' Records Committee — DOUGLAS BROWN, New York & Queens Electric Light & Power Co., Long Island City, N. Y.

*Fixed Capital Committee—J. A. ROCKWOOD, Portland Electric Power Co., Portland, Ore.

*General Records Committee—K. B. CRUMB, American Gas & Electric Co., New York, N. Y.

*Purchasing and Storeroom Committee—W. G. YOUNG, New York & Queens Electric Light & Power Co., Long Island City, N. Y.

*Statistics Committee—HARRY A. SNOW, The Detroit Edison Co., Detroit, Mich.

COMMERCIAL NATIONAL SECTION

*Section's Executive Committee—MARSHALL E. SAMPSELL, Central Illinois Public Service Co., Chicago, Ill.

*Commercial and Industrial Power and Heating Bureau—V. M. F. TALLMAN, Charles H. Tenney & Co., Boston, Mass.

Commercial Cooking Committee—O. WILHELMY, The Union Gas & Electric Co., Cincinnati, Ohio.

Electric Truck Committee—GUY W. THOMAS, Public Service Co. of Colorado, Denver, Colo.

General Power Committee—H. C. THUERK, Erie Lighting Co., Erie, Pa.

Industrial Heating Committee—J. L. FADEN, The Edison Electric Illuminating Co., Boston, Mass.

*Lighting Bureau—T. O. KENNEDY, The Ohio Public Service Co., Cleveland, Ohio.

Commercial and Industrial Lighting Committee—J. DANIELS, The Edison Electric Illuminating Co., Boston, Mass.

Electrical Advertising Committee—C. J. EATON, Middle West Utilities Co., Chicago, Ill.

Home Lighting Committee—W. T. BLACKWELL, Public Service Electric & Gas Co., Newark, N. J.

Street Lighting Committee—R. J. MALCOMSON, Public Service Co. of Northern Illinois, Chicago, Ill.

*Merchandising Bureau—FRANK D. PEMBLETON, Public Service Electric & Gas Co., Newark, N. J.

Domestic Electric Range Committee—F. A. COUPAL, Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.

Merchandise Sales Committee—C. L. HAROLD, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

Refrigeration Committee—C. L. DUNN, The Ohio Public Service Co., Cleveland, Ohio.

Water Heating Committee—NORMAN T. WILCOX, Stone & Webster, Inc., Boston, Mass.

*Customer Relations Committee—H. T. EAST, Public Service Co. of Northern Illinois, Chicago, Ill.

Promotional Rates Committee—E. W. LLOYD, Commonwealth Edison Co., Chicago, Ill.

*Wiring Sales Committee—A. P. GOOD, Commonwealth Edison Co., Chicago, Ill.

ENGINEERING NATIONAL SECTION

*Section's Executive Committee—E. C. STONE, Duquesne Light Co., Pittsburgh, Pa.

*Accident Prevention Committee—C. R. BEARDSLEY, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

*Electrical Apparatus Committee—J. A. JOHNSON, The Niagara Falls Power Co., Niagara Falls, N. Y.

Engineering Administration Committee—H. P. LIVERSIDGE, The Philadelphia Electric Co., Philadelphia, Pa.

*Hydraulic Power Committee—BYRON E. WHITE, Utica Gas & Electric Co., Utica, N. Y.

*Inductive Coordination Committee—H. L. WILLS, Georgia Power Co., Atlanta, Ga.

*Meter Committee—E. E. HILL, The New York Edison Co., New York, N. Y.

*Overhead Systems Committee—HAROLD COLE, The Detroit Edison Co., Detroit, Mich.

*Power System Engineering Committee—L. W. W. MORROW, _Electrical World,_ New York, N. Y.

*Prime Movers Committee—E. B. RICKETTS, The New York Edison Co., New York, N. Y.

Special Engineering Research Committee—C. F. HIRSHFELD, The Detroit Edison Co, Detroit, Mich.

*Underground Systems Committee—J. W. SYLVESTER, The Philadelphia Electric Co., Philadelphia, Pa.

PUBLIC RELATIONS NATIONAL SECTION

***Section's Executive Committee**—J. F. OWENS, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

***Cooperation with Educational Institutions**—CARL D. JACKSON, 36 West 44th Street, New York, N. Y.

***Customer Ownership**—W. H. HODGE, Byllesby Engineering & Management Corp., Chicago, Ill.

***Industrial Relations Committee**—HOMER E. NIESZ, Commonwealth Edison Co., Chicago, Ill.

***Information Bureau Organizations Committee**—T. A. KENNEY, Allied Power & Light Corp., New York, N. Y.

Manufacturers' Advertising Committee—T. J. McMANIS, General Electric Co., Schenectady, N. Y.

***Public Speaking Committee**—W. S. VIVIAN, Middle West Utilities Co., Chicago, Ill.

***Relations with Financial Institutions Committee**—A. W. ROBERTSON, Westinghouse Electric & Manufacturing Co., New York, N. Y.

***Women's Committee**—MISS SOPHIA MALICKI, Middle West Utilities Co., Chicago, Ill.

***Provision is made for a representative from each Geographic Division.**

CONVENTIONS AND MEETINGS

Meeting of the Section, Bureaus and Committees of the National Electric Light Association are shown in roman type; those of other associations in italics

1929

March

4–5 Cooperation with Educational Institutions Committee, 11:00 a. m., N.E.L.A. Headquarters, New York, N. Y.

4–6 *American Railway Association, Division 4, Engineering Signal Section, Stevens Hotel, Chicago, Ill.*

5 Public Speaking Committee, 10:30 a. m., N.E.L.A. Headquarters, New York, N. Y.

5 Women's Committee, 10:00 a. m., Room 600, 420 Lexington Avenue, New York, N. Y.

5 Insurance Committee, N. E. L. A. Headquarters, 10:00 a. m., New York, N. Y.

6 Executive Committee, Public Relations National Section, 10:30 a. m., N. E. L. A. Headquarters, New York, N. Y.

6 *New York Electrical Society, New York, N. Y.*

6 Rural Electric Service Committee, 10:30 a. m., Room 600, 420 Lexington Avenue, New York, N. Y.

7 National Executive Committee, 10:30 a. m., N. E. L. A. Headquarters, New York, N. Y.

8 *Board of Directors, Society for Electrical Development, New York, N. Y.*

11–12 Hydraulic Power Committee, Peabody Hotel, Memphis, Tenn.

11–12 Overhead Systems Committee, Peabody Hotel, Memphis, Tenn.

11–12 Power Systems Engineering Committee. Peabody Hotel, Memphis, Tenn.

11–12 Prime Movers Committee, Peabody Hotel, Memphis, Tenn.

12 Executive Commitee, Engineering National Section, Peabody Hotel, Memphis, Tenn.

12–13 Accident Prevention Committee, Peabody Hotel, Memphis, Tenn.

12–14 Oklahoma Utilities Association, Oklahoma City, Okla.

13–14 Electrical Apparatus Committee, Peabody Hotel, Memphis, Tenn.

13–14 Inductive Coordination Committee, Peabody Hotel, Memphis, Tenn.

13–14 Meter Committee, Peabody Hotel, Memphis, Tenn.

13–14—Underground Systems Committee, Peabody Hotel, Memphis, Tenn.

17–23 *Oklahoma A. & M. College Short Course, Stillwater, Okla.*

19–20 Merchandising Conference, Great Lakes Geographic Division, Edgewater Beach Hotel, Chicago, Ill.

20 Commercial and Industrial Lighting Committee, 9:30 a. m., Edgewater Beach Hotel, Chicago, Ill.

20 Electrical Advertising Committee, 10:30 a. m., Edgewater Beach Hotel, Chicago, Ill.

20 Street Lighting Committee, 9:30 a. m., Edgewater Beach Hotel, Chicago, Ill.

20 Water Heating Committee, 9:30 a. m., Edgewater Beach Hotel, Chicago, Ill.

20 Electric Truck Committee, 9.30 a. m., Edgewater Beach Hotel, Chicago. Ill.

20 General Power Committee, 9.30 a. m., Edgewater Beach Hotel, Chicago, Ill.

20 Customer Relations Committee, 9:30 a. m., Edgewater Beach Hotel, Chicago, Ill.

20–22 *American Institute of Electrical Engineers, Regional Meeting, Cincinnati, Ohio.*

21 Home Lighting Committee, 9:30 a. m., Edgewater Beach Hotel, Chicago, Ill.

21 Domestic Electric Range Committee, 9:30 a. m., Edgewater Beach Hotel, Chicago, Ill.

21 Merchandising Sales Committee, 9:30 a. m., Edgewater Beach Hotel, Chicago, Ill.

21 Refrigeration Committee, 9:30 a. m., Edgewater Beach Hotel, Chicago, Ill.

21 Commercial Cooking Committee, 9:30 a. m., Edgewater Beach Hotel, Chicago, Ill.

21 Industrial Heating Committee, 9:30 a. m., Edgewater Beach Hotel, Chicago, Ill.

21 Promotional Rates Committee, 9:30 a. m., Edgewater Beach Hotel, Chicago, Ill.

21 Wiring Sales Committee, 9:30 a. m.. Edgewater Beach Hotel, Chicago, Ill.

21–23 *American Society of Mechanical Engineers, Knoxville, Tenn.*

22 Executive Committee, Commercial National Section, 10:00 a. m., Edgewater Beach Hotel, Chicago, Ill.

25–30 *Purdue University Short Course, Lafayette, Ind.*

April

1–2 Industrial Heating Conference, Great Lakes Power Club, University of Michigan, Ann Arbor, Mich.

3 *New York Electrical Society, New York, N. Y.*

5 Commercial Section, Great Lakes Geographic Division, Detroit, Mich.

12 Maryland Utilities Association, Emerson Hotel, Baltimore, Md.

4–13 *Home Complete Exposition, Indiana State Fair Grounds, Indianapolis, Ind.*

17–18 *National Warm Air Heating and Ventilating Association, Indianapolis, Ind.*

18–20 Engineering Section, Great Lakes Geographic Division, Drake Hotel, Chicago, Ill.

18–20 Arizona Utilities Association, Tucson, Ariz.

21–23 *American Society of Civil Engineers, Dallas, Texas.*

22–26 *American Welding Society, Engineering Societies Bldg., New York, N. Y.*

24–26 Middle West Geographic Division, Hotel Fontenelle, Omaha, Neb.

29–30 *Chamber of Commerce of the U. S. A., Washington, D. C.*

30 Southwestern Geographic Division, Hot Springs, Ark.

30 Arkansas Utilities Association, Hot Springs, Ark.

May

1–3—Southwestern Geographic Division, Hot Springs, Ark.

1–3 Arkansas Utilities Association, Hot Springs, Ark.

1–3 *Chamber of Commerce of the U. S. A., Washington, D. C.*

1–3 *Indiana Public Utilities Association. Hotel Gary, Gary, Ind.*

1–3 Indiana Electric Light Association, Hotel Gary, Gary, Ind.

1–3 *Indiana Gas Association, Hotel Gary, Gary, Ind.*

7–9 *American Institute of Electrical Engineers, Regional Meeting, Dallas, Texas.*

7–10 East Central Geographic Division. Brown Hotel, Louisville, Ky.

8–10 Southeastern Geographic Division, Asheville, N. C.

13–15 *American Society of Mechanical Engineers, Rochester, N. Y.*

13–16 *National Fire Protection Association. Memphis, Tenn.*

13–16 *National Fire Protection Association, Memphis, Tenn.*

13–24 Industrial Heating School, Case School of Applied Science, Cleveland, Ohio.

20–25 National Electrical Manufacturers Association, The Homestead, Hot Springs, Va.

27–31 *National Electrical Wholesalers Association, The Homestead, Hot Springs, Va.*

27–31 *General Federation of Women's Clubs. Swampscott, Mass.*

31 Commercial Section, Great Lakes Geographic Division, Indianapolis, Ind.

June

3–7 Annual Convention and Exhibition, NATIONAL ELECTRIC LIGHT ASSOCIATION, Municipal Auditorium, Atlantic City, N. J.

10–15 *Westinghouse Agent-Jobber's Association, The Homestead, Hot Springs, Va.*

14 *Board of Directors, Society for Electrical Development, New York. N. Y.*

16–18 North Central Geographic Division, Breezy Point Summer Resort. Pequot, Minn.

18–21 *Society of Automotive Engineers. New York, N. Y.*

19–21 Canadian Geographic Division, Algonquin Hotel, St. Andrews-by-the-Sea, N. B.

19–22 Pacific Coast Geographic Division. Del Monte, Cal.

20–21 Accounting Section, Wisconsin Utilities Association, Sheboygan, Wis.

24–28 *American Society for Testing Material, Atlantic City, N. J.*

24–28 *American Institute of Electrical Engineers, Swampscott, Mass.*

26–29 Northwest Geographic Division, Seattle, Wash.

July

1–1 *American Society of Mechanical Engineers, Salt Lake City, Utah*

1–5 *American Home Economics Association Convention and Exhibition. Statler Hotel, Boston, Mass.*

18–19 Electric Section, Wisconsin Utilities Association, Hotel Wausau, Wausau, Wis.

August

27–30 *National Association of Railroad and Utilities Commissioners, Glacier National Park Hotel, Glacier National Park, Mont.*

September

4–6 Pennsylvania Electric Association. Bedford Springs Hotel, Bedford Springs, Pa.

9–11 Rocky Mountain Geographic Division Hotel Colorado, Glenwood Springs. Colo.

9–12 New England Geographic Division, Hotel Griswold, New London, Conn.

9–13 *American Society for Steel Treating, Cleveland, Ohio.*

19–20 Empire State Gas and Electric Association, Saranac Inn, Saranac Lake, N. Y.

28–30 *American Electric Railway Association Convention and Exhibit, Atlantic City Auditorium, Atlantic City, N. J.*

30 *National Safety Council, Stevens Hotel, Chicago, Ill.*

October

1–4 *American Electric Railway Association Convention and Exhibit, Atlantic City Auditorium, Atlantic City, N. J.*

1–4 *National Safety Council, Stevens Hotel, Chicago, Ill.*

14–18 *American Gas Association, Atlantic City, N. J.*

New Members

Electric Light and Power Companies (Class A)

Arkansas, Fort Smith, Mississippi Valley Power Company

Connecticut, Unionville, The Union Electric Light & Power Company

Canada, Alberta, Calgary, Canadian Utilities, Limited

Canada, N. S., Yarmouth, Western Nova Scotia Electric Company, Limited

Canada, Quebec, Montreal, South Shore Light, Heat & Power Corp.

Employees of Electric Light and Power Companies (Class B)

Alabama, Birmingham, Alabama Power Company
Charles W. Kenyon (Anniston, Ala.)
Oscar R. Ringwall (Southeastern Power & Light Company, 120 Broadway, New York, N. Y.)

California, San Francisco, Coast Counties Gas & Electric Company
B. M. Rice (Gilroy, Calif.)
Joseph B. Wilson (Santa Cruz, Calif.)

California, San Francisco, Pacific Gas & Electric Company
Arthur H. Anderson
Frank Anson (Stockton, Calif.)
F. E. Cook, Jr.
F. S. Curren
A. C. Eddy (Stockton, Calif.)
E. M. Fraley
C. Gentis (Oakland, Calif.)
E. W. Hodges
Roscoe Jensen
E. C. Johnson (Oakland, Calif.)
C. A. Jordan
A. S. Kipsey (Angels Camp, Calif.)
F. P. Lallement (Sacramento, Calif.)
Walter F. Noggle (Red Bluff, Calif.)
Ray L. Trabucco (Sonora, Calif.)
Alex Walls
C. A. Wilcox

Connecticut, Hartford, The Hartford Electric Light Company
Major A. G. Pendleton
E. H. Tyrol

Connecticut, New London, The Connecticut Power Company
E. L. Roberts (Canaan, Conn.)

Connecticut, Thompsonville, The Northern Connecticut Power Company
Edward Gardner

Connecticut, Unionville, The Union Electric Light & Power Company
Daniel C. Payne
Carl W. Turner

Connecticut, Waterbury, Connecticut Light & Power Company
Miss Marjorie Ann Buckley (Norwalk, Conn.)
Miss Myrtle K. Scholz (New Britain, Conn.)

Connecticut, Willimantic, The Rockville-Willimantic Lighting Company
G. L. Black
R. H. Gibson
P. L. Moran
C. H. Reinhardt

Florida, Miami, Florida Power & Light Company
J. F. Wilkinson (Titusville, Fla.)

Florida, St. Petersburg, Florida Power Corporation
Walter C. Schoeppe

Florida, Tampa, Tampa Electric Company
Malcolm R. McKinley
Miss Agnes Manke

Georgia, Albany, South Georgia Power Company
R. C. Furst (Columbus, Ga.)

Georgia, Atlanta, Georgia Power Company
F. B. Culley (Augusta, Ga.)

Georgia, Columbus, Columbus Electric and Power Company
B. F. Billings, Jr.
Miss Madeline Blissett
Miss Mattie Ree Combs
Miss Sarah Fulford
Flora Jenkins
Miss Myra Koehne
Miss Mary McElroy
Mrs. LaMottee McEwen
Miss Effie Maddux
Mrs. L. G. Moyer
Mrs. Jessie Richards
Miss Louise Turner

Georgia, Savannah, Savannah Electric & Power Company
Henry V. Faber

Idaho, Boise, Idaho Power Company
Stanley M. Brown (Payette, Idaho)
A. E. Carlos
Chas. Elliott (Twin Falls, Idaho)
Paul J. Gilman (Twin Falls, Idaho)
H. L. Holmes (Twin Falls, Idaho)
Albert L. Leick
M. W. Lunstrum (Payette, Idaho)
R. W. Mangun (Nampa, Idaho)
M. A. Newman (Twin Falls, Idaho)
Wm. H. Putnam (Twin Falls, Idaho)
Nathan L. Scott
Merritt Shotwell (Twin Falls, Idaho)
W. E. Wayne

Illinois, Aurora, Western United Gas & Electric Company
D. E. Bloss
C. I. Carlson
Daniel Garrity (Wheaton, Ill.)
F. W. Geist
Nathan Knuth
L. C. Meyer (LaGrange, Ill.)
J. W. O'Connell (Geneva, Ill.)
H. J. Olson
B. R. Richardson
S. J. Ricker
Murray D. Smith

Illinois, Chicago, Byllesby Engineering & Management Corporation
F. H. Lane

Illinois, Chicago, Commonwealth Edison Company
Paul W. Beedle
Miss Marie Keegan
J. F. Kennett
Joe L. Smith
John L. Suffka
John P. Wiegman

Illinois, Chicago, Illinois Power & Light Corporation
Alfred Gillespey (Collinsville, Ill.)
Miss Ethel L. Stanton (Kewanne, Ill.)

Illinois, Chicago, Public Service Co. of Northern Illinois
C. H. Kreger
Harry E. Noren (Evanston, Ill.)
F. R. Wightman

Illinois, Galena, Interstate Light & Power Company
John A. Gregor
William D. Houy

Illinois, Peoria, Central Illinois Light Company
Henry J. Bickerman
Thomas F. Morris
James D. Whitley

Illinois, Springfield, Central Illinois Public Service Company
Miss Mary L. Dilley (Quincy, Ill.)
Miss Helen M. Huss (Beardstown, Ill.)

Illinois, Springfield, Illinois Power Company
Miss Jessie M. Hunsley

Indiana, Clinton, Wabash Valley Electric Company
Miss Grace Barnard (Roachdale, Ind.)

Indiana, Indianapolis, Indianapolis Power & Light Company
Roy Thurman

Kentucky, Maysville, Kentucky Power & Light Company, Inc.
Edwin C. Toleman (Augusta)

Louisiana, New Iberia, Gulf Public Service Company
P. J. Nolan
A. L. Willy

Louisiana, Shreveport, Southwestern Gas & Electric Company
Sam Cunningham (Fayetteville, Ark.)

Maine, Bangor, Bangor Hydro-Electric Company
P. L. Sprague

Maine, Presque Isle, Gould Electric Company
F. G. Barnett
H. K. Graves

Maryland, Hagerstown, The Potomac Edison Company
Roland Bowers
M. F. Riley
R. E. Town (Frederick, Md.)

Massachusetts, Amherst, Amherst Gas Company
Miss Margaret E. Maloney

Massachusetts, Boston, Edison Electric Illuminating Company of Boston
Ernest J. Chadd
Miss F. Pauline Pease

Massachusetts, Boston, Ludlow Electric Light Company
Miss Glenna L. Amsden (Springfield, Mass.)

Massachusetts, Boston, New England Power Company
Miss M. Gertrude Whilton

Massachusetts, Boston, The Twin State Gas & Electric Company
Glover W. Rogers

Massachusetts, Easthampton, Easthampton Gas Company
Miss Nora M. Connery

Massachusetts, Gloucester, Gloucester Electric Company
H. Sherman Holcomb
Arthur F. Maxner
Edward B. Spike

Massachusetts, Lowell, Lowell Electric Light Corporation
Edward Bower

Massachusetts, Malden, Malden Electric Company
Roland P. O'Hanley

Massachusetts, North Abington, The Electric Light & Power Company of Abington and Rockland
T. M. Dyer
Harry L. Swicegood

Massachusetts, Palmer, Central Massachusetts Electric Company
Stanley Topor

Massachusetts, Plymouth, Plymouth Electric Light Company
Miss Sara C. Bodell

Massachusetts, Springfield, The Agawam Electric Company
Miss M. Olive Brosnahan

Michigan, Ludington, Michigan Public Service Company
J. P. Smith (Traverse City, Mich.)

Minnesota, Dubuque, Interstate Power Company
G. H. Ross (Waconia, Minn.)

Minnesota, Fergus Falls, Otter Tail Power Company
Miss Myrtle B. Brandvold
Geo. Davidson (Morris, Minn.)

Minnesota, Minneapolis, Public Utilities Consolidated Corp.
B. O. Ellis

Missouri, Kansas City, Missouri Power and Light Company
N. R. Beagle (Jefferson City, Mo.)
J. F. Duncan (Moberly, Mo.)

Missouri, Pleasant Hill, Missouri Public Service Company
J. H. Dunlap (Warrensburg, Mo.)
J. E. Lamb (Warrensburg, Mo.)

Nebraska, Lincoln, Iowa-Nebraska Light & Power Company
B. H. Conlee
A. C. Floto (Seward, Neb.)
F. C. Hush (Lincoln, Neb.)

Nebraska, Loup City, Nebraska Electric Power Co.
A. L. Dobson (Broken Bow, Neb.)
R. M. McCandless (Lexington, Neb.)
Nelson Smith (Loup City, Neb.)

Nebraska, Omaha, Central West Public Service Company
R. P. Waite (Woonsocket, S. D.)

Nebraska, Omaha, Nebraska Power Company
(Mrs.) B. E. Marsh
Lee J. Ruf

Nebraska, Scottsbluff, Western Public Service Company
George Duborg (Chadron, Neb.)
E. W. Harvey (Auburn, Neb.)
Miss Thelma Holloway (Holdredge, Neb.)
R. H. Libby (Holdrege, Neb.)
M. H. Soule (Laramie, Wyoming)
A. S. J. Steele

New Hampshire, Manchester, Public Service Company of New Hampshire
Mrs. Doris Christian (Nashua, N. H.)
W. F. Norton (Nashua, N. H.)

New York, Albany, New York Power & Light Corporation
Miss Mary Elizabeth Farrell (Cohoes, N. Y.)

New York, Lancaster, Western New York Gas & Electric Corp.
Gordon W. Batz (Buffalo, N. Y.)
Ernest Zeferjahn

New York, Bronx, Bronx Gas & Electric Company
Frank J. Gallagher
Miss Vera A. McCann

New York, Brooklyn, Brooklyn Edison Company, Inc.

Dean Allen
Frederick J. Andrews
John C. Arnell
Axel E. Boye
Edgar Broad
Arthur N. Brown
Charles F. Brown
John Brownlie
Henry W. Butterfield
Gerald Byrnes
James M. Campbell
Alf. L. Carroll
Russell E. Caywood
Miss Mary F. Clock
James M. Comly
John B. Conlan
E. F. Cowles
Harry B. Cramer
Herman Edwin D'Andrade
Edward N. Davis
James E. Dolan
T. J. Donovan
Joseph W. Doyle
Robert Molton Falkner
Otto Freiermuth
Howard H. Frye
Arthur L. Gill
Joseph A. Guise
Arthur E. Hald
Otto N. Hansen
Miss Grace Constance Hasbrouck
Andrew Heimberger
John Xavier Hogan
Walter A. Howe
Alexander Johnson
James J. Joy
Henry A. Kassebart

New York, Brooklyn, Brooklyn Edison Company, Inc.

John Lester Kilpatrick
Henry C. Lange
Harold L. Lawson
Harvey W. Leonard
Wm. H. Lewis
Harry G. Littlewort
M. J. Lynch
John R. McGrath
William H. McKinney
Edward J. McNamara
Hugh J. McPartland
F. Wm. Maennle
D. Leonard Maiorino
Douglass W. Marshall
W. S. Martin
Howard L. Moffatt
William H. Morgan
Walter B. Mulligan
Robert Joseph Murphy
Joseph W. Murray
George A. Nelson
John G. Noest
D. J. O'Brien
Frank M. O'Brien
John M. O'Connor
C. B. Ohnemuller
Harold S. O'Keefe
Shelley O'Neal
George W. Palmer
John Henry Pilkington
William N. Quick
George W. Rainforth
George J. Read
Edward F. Reese
Charles F. Ryan
George F. Schanck
George E. Scholottmann
Carl Edward Schneider
James J. Smith
George H. Teommey
William Edward Thake
John S. Voorhees
William C. Vreeland
William H. Wallace, Jr.
Seward A. Warner
Adam Zajac

New York, New York, New York Edison Company

Richard Robert Cole
H. P. Dale
James B. Horn (New Rochelle, N. Y.)
Herman M. Lehmann (Glendale, L. I., N. Y.)
John W. Lindsay
Joseph Miller
William G. Patton
Edward Francis Vogel

New York, New York, United Electric Light & Power Co.,

Arthur H. Acken, Jr.
Louis James Brown (Brooklyn, N. Y.)
Arthur H. Christiansen
Nicholas P. Sheridan

New York, Long Island City, New York & Queens Electric Light & Power Co.

Harold N. Bacon
Miss Agnes Barr (Astoria, L. I.)
Arthur B. Brandler (Brooklyn, N. Y.)
William Pell (Brooklyn, N. Y.)
Michael Schinn (Flushing, N. Y.)
George E. Winfield

New York, Staten Island, St. George, Staten Island Edison Corporation

G. D. Bessi
C. A. Bohan

New York, Niagara Falls, Niagara Electric Service Corporation

James E. Barry, Jr.
Lawrence E. Constable
Noble G. Irish

New York, Poughkeepsie, Central Hudson Gas and Electric Corp.

Donald D. Parry
Robert Strite

New York, Syracuse, The Syracuse Lighting Company, Inc.

Charles A. McNeal

North Carolina, Raleigh, Carolina Power & Light Company

J. C. Hunter

North Carolina, Wilmington, Tide Water Power Company
G. P. Wylly, Jr.

Ohio, Cleveland, Lake Erie Power & Light Co.
Stanley Davis (Bellevue, Ohio)
R. R. Dilenschneider (Fremont, Ohio)
W. G. Gallup (Bellevue, Ohio)
Ralph H. Sayles (Clyde, Ohio)

Oklahoma, Oklahoma City, Oklahoma Gas and Electric Company
John Cox (Healdton, Oklahoma)
Miss Lena Cox
Dr. E. G. Green
K. P. Herber
W. R. Heyman
H. I. Josey
T. G. Kelly (Poteau, Oklahoma)
D. S. Kennedy (Muskogee, Oklahoma)
V. H. Kershner (Enid, Oklahoma)
C. H. Lamphere (Alva, Oklahoma)
W. S. Shaw (Tishomingo, Oklahoma)

Pennsylvania, Chester, Delaware County Electric Company
Arthur R. Barhydt
James N. Greaves (Lansdowne, Pa.)
Charles H. Keen (Norwood, Pa.)
Carl A. Kendig (Folsom, Pa.)
Winfield S. Lee (Morton (Del. Co.), Pa.)
Miss Mary Simpkins (Media, Pa.)
Frederick S. Wright (Chester, Pa.)

Pennsylvania, Coatesville, Chester Valley Electric Company
C. R. Grab

Pennsylvania, Norristown, Philadelphia Suburban Counties Gas & Elec. Co.
Clarence W. Andrews (Chester, Pa.)
Morison Blake (Philadelphia, Pa.)
Frank W. Brady (Upper Darby, Pa.)
Thomas Brown (Chester, Pa.)
Francis J. Buckley (Chester, Pa.)
William Burk (Media, Pa.)
Wm. J. Cohen (Upland, Pa.)
Harry C. Custer (Norristown, Pa.)
Frank Donnelly (West Chester, Pa.)
William R. Duncan (Chester, Pa.)
Clifford R. Evans (Media, Pa.)
Norman H. Evans (Springfield, Media, R. F. D., Pa.)
Granville M. Fisher (Jenkintown, Pa.)
Edward George (West Chester, Pa.)
Joseph H. Goff, Jr. (West Chester, Pa.)
Richard T. Haley, Sr. (West Chester, Pa.)
Hubert W. Henley (Chester, Pa.)
William John Hughes (Colwyn, Del. Co., Pa.)
D. W. Jardine (Jenkingtown, Montg. Co., Pa.)
Wm. Henry Jones (Jenkintown, Pa.)
Ralph A. Krauss (Philadelphia, Pa.)
Harry E. LeVan (Philadelphia, Pa.)
J. Henry Long (Chester, Pa.)
Malcolm E. Mackey (Ardmore, Pa.)
F. Hampton Morris (Bristol, Pa.)
Samuel L. Parris (Chester, Pa.)
Wm. E. Pepper (Chester, Pa.)
Francis J. Pierson (Darby, Pa.)
Leonard M. Regester (West Chester, Pa.)
Jule I. Rogers (Philadelphia, Pa.)
Wm. W. Ross (West Chester, Pa.)
Ralph W. Snyder (West Chester, Pa.)
John Stainton (Chester, Pa.)
H. R. Sterrett (Ardmore, Pa.)
Marshall W. Way (Ardmore, Pa)
Chas. H. West (Chester, Pa.)
Grenville S. Wilcox (Jenkintown, Pa.)
Wm. P. Wood (Wyncote, Pa.)

Pennsylvania, Philadelphia, The Philadelphia Electric Company
Raymond L. Alexander
Jack L. Berman
Thomas H. Beyer, Jr.
Clyde T. Bishoff
Albert M. Boyd
Edmund H. Boyer
Miss Catherine E. Boyle
George L. Bruning
Jack Butterworth
W. Warren Cope
Lorenzo L. Dean
Alexander Malcolm Dickie
J. Frank Dreher
David A. Duioss
H. Anderson Eddy

Rhode Island, Pawtucket, Blackstone Valley Gas & Electric Co.
Perry H. Hodgman
John W. Kelly
Dexter S. Luther, Jr.
William E. O'Neill
Raymond N. Rowe
Frank A. Tracy
Charles E. Trull
Kimball L. Wheeler

Rhode Island, Providence, Narragansett Electric Company
E. F. Leach

Tennessee, Chattanooga, The Tennessee Electric Power Company
Mrs. Eva Wilson

Texas, Dallas, Central and South West Utilities Company
Ray Baumgardner

Texas, Dallas, Dallas Power & Light Company
R. A. Laird

Texas, Forth Worth, Fort Worth Power & Light Company
Miss Floyd B. Acker

Texas, Houston, Houston Lighting & Power Company
J. J. Finegan

Virginia, Richmond, Virginia Public Service Company
Mrs. Kathleen J. Dame (Charlottesville, Va.)
Miss Helen L. MacDonald (Alexandria, Va.)
J. M. Wilson (Clifton Forge, Va.)

Virginia, Winchester, Northern Virginia Power Company
D. E. Stultz

West Virginia, Petersburg, Potomac Valley Power Corporation
Frank B. Northrop

Wisconsin, Ashland, Lake Superior District Power Company
Miss Skulda Baner (Ironwood, Michigan)

Wisconsin, Eau Claire, Northern States Power Company
C. B. Ayars (Sparta, Wisconsin)

Wisconsin, Madison, Wisconsin Power and Light Company
A. F. Bolgrien (Spring Green, Wis.)
A. A. Oldfield
H. A. Sheridan (Baraboo, Wis.)

Canada, N. S., Sydney, Cape Breton Electric Co., Ltd.
W. M. Bird, Esq.

Canada, Quebec, Huntingdon, Beauharnois Electric Co., Ltd.
A. C. Abbott, Esq. (Valleyfield, Quebec, Canada)
Armand Letourneau, Esq. (Beauharnois, Quebec, Canada)

Canada, Quebec, Three Rivers, North Shore Power Company
Lester McGillis, Esq.

Manufacturers (Class D)

New York, New York, The Kempton Manufacturing Corporation

Connecticut, Bridgeport, Bridgeport Brass Company

Michigan, Detroit, Knott and Garllus Company

Nebraska, Omaha, Clark Electric Water Heater

New York, Jamestown, Blackstone Mfg. Co.

New York, New York, Tork Clocks, Inc.

Canada, Ontario, Hamilton, Boston Insulated Wire & Cable Co., Ltd.

Canada, Ontario, Toronto, Thor-Canadian Co., Ltd.

Employees of Manufacturing Companies (Class E)

Connecticut, New Haven, The Bigelow Company
G. Welter

Connecticut, Plainville, Trumbull Electric Mfg. Co.
Hon. John H. Trumbull
Frank T. Wheeler

Illinois, Chicago, Federal Electric Company
James M. Gilchrist
W. A. Keating
F. A. Orth
H. A. Wilson

Indiana, Indianapolis, Transelectric Company
Clarence E. Chatfield

Iowa, Newton, One Minute Manufacturing Company
F. H. Bergman

Massachusetts, Boston, Condit Electrical Mfg. Corp.
Cecil B. Spaulding

Massachusetts, Boston, Simplex Wire & Cable Company
Thomas Wray (Cleveland, Ohio)

Massachusetts, Watertown, Hood Rubber Company
Howard A. Hands

Massachusetts, Worcester, M. S. Wright Company
Dwight C. Daniels
Samuel W. Phelps
Geoffrey H. Powers
Henry H. Wright

Michigan, Detroit, Knott and Garllus Company
W. H. Goebel
F. W. Kall (New York, N. Y.)
G. H. Lapiner
F. E. Ritzenheim
C. L. Taliaferro (Philadelphia, Pa.)

Michigan, Grand Rapids, Leonard Division of Kelvinator Corp.
Richard Fassnacht

Missouri, St. Louis, Electrol Incorporated
J. P. Feeley

Nebraska, Omaha, Clark Electric Water Heater, Div. of McGraw Electric Co.
Murray R. Bird (Cherrydale, Va.)
Charles R. Cornic

New Jersey, Orange, Edison Storage Battery Co.
J. L. Hays (West Orange, N. J.)
F. D. Van Lew (New York, N. Y.)

New Jersey, Orange, Thomas A. Edison, Inc.
Roland S. Ames
Boyd R. Berry
Leon C. Buzzell
Richard B. Carpenter
J. Lester Case
Joseph P. Dornick
Geo. R. Zust (West Orange, N. J.)

New York, New York, Consolidated Ashcroft Hancock Company, Inc.
Gustav A. Binz (Chicago, Ill.)

New York, New York, Dubilier Condenser Corporation
W. H. Lipscomb
Geo. E. Palmer
F. W. Watts

New York, New York, Gould Storage Battery Co., Inc.
E. J. Mohr (Depew, N. Y.)

New York, New York, Graybar Electric Co., Inc.
W. N. Chessman (Springfield, Mass.)

New York, New York, Tabulating Machine Company
L. H. LaMotte

New York, New York, Worthington Pump & Machinery Corp.
George W. Hawkins

New York, Niagara Falls, Globar Corporation
Benedict A. Bovee
Oscar Brophy (Philadelphia, Pa.)

New York, Schenectady, General Electric Company
W. J. Delehanty
D. M. Jones
D. J. Prudhomme (San Francisco, Cal.)
Butler E. Ward (Chicago, Ill.)
Frank H. Winkley

Ohio, Canton, Nelson & Kuemmerling
K. L. Baker (Maplewood, Mo.)
R. A. Kopp (Cleveland, Ohio)
Ross N. Lillard (Elkhart, Indiana)
G. R. Pownall (Toledo, Ohio)
E. E. Sottong (Baltimore, Md.)
John Tinter (Akron, Ohio)
Lee Wade (Youngstown, Ohio)
Byron Wert (Lynchburg, Va.)

Ohio, Canton, Union Metal Mfg. Co.
Ernest H. Bradley (Boston, Mass.)

Ohio, Toledo, Swartzbaugh Mfg. Co.
A. H. Mills (New York, N. Y.)

Pennsylvania, East Pittsburgh, Westinghouse Electric & Mfg. Co.
C. C. Potts (Los Angeles, Cal.)

Pennsylvania, Greensburg, Railway & Industrial Engineering Co.
Everett B. Sawyer (Denver, Colorado)

Pennsylvania, Philadelphia, Atwater Kent Mfg. Co.
L. A. Charbonnier
J. E. Delp, Jr.
L. F. Hook (Milwaukee, Wis.)
G. H. Jaud (Chicago, Ill.)
J. M. Kelley (Buffalo, N. Y.)
J. M. McGuigan, Jr. (Cleveland, Ohio)
L. A. Pratt (Minneapolis, Minnesota)
H. T. Stockholm (Philadelphia, Pa.)
P. A. Ware (Philadelphia, Pa.)
L. M. Willis (Hollywood, Cal.)

Pennsylvania, Philadelphia, Leeds & Northrup Company
S. B. Morehouse

Pennsylvania, Pittsburgh, Hubbard & Company
H. H. Manny (Seattle, Washington)

Pennsylvania, Pittsburgh, Oliver Iron and Steel Corp.
J. W. Braffett (Detroit, Mich.)
Nelson G. Craig (Philadelphia, Pa.)

Pennsylvania, Pittsburgh, Standard Underground Cable Company
T. S. Gildersleeve (New York, N. Y.)

Canada, Ontario, Toronto, Canada Wire & Cable Company
W. P. Roper, Esq. (Montreal, Quebec, Canada)

Canada, Quebec, Montreal, General Steel Wares, Limited
Murray W. Hayes, Esq. (Quebec, Quebec, Canada)

Associated Companies (Class F)

California, Los Angeles, Bent Concrete Pipe Company
California, Oakland, Pacific Electric Motor Company
California, San Francisco, Fred H. Tibbetts, Civil Engineer
California, San Francisco, Utilities Equipment Corporation
Massachusetts, Boston, John Livor, Incorporated
New York, New York, W. J. Henderson
New York, New York, International Standard Electric Corporation
New York, New York, The Joslyn Company
New York, New York, Harry Alvin Kidder, Supt. of Motive Power
New York, New York, Stone & Webster Engineering Corporation
New York, New York, W. S. Wilson Corporation
Pennsylvania, Philadelphia, United Engineers & Constructors, Inc.
Porto Rico, Antillas Electric Corporation
Canada, N. S., Liverpool, Mersey Paper Company, Limited
Canada, Ontario, Hamilton, Allen Engineering Co., Ltd.
Canada, Quebec, Grand 'Mere, Canada Power & Paper Corp.
Canada, Quebec, Shawinigan Falls, Canada Power & Paper Corp.
Canada, Quebec, Shawinigan Falls, Shawinigan Chemicals, Limited

Employees of Associated Companies (Class G)

California, Oakland, Pacific Electric Motor Company
F. E. Boyd

California, San Francisco, W. Wesley Hicks
C. A. Russell

California, San Francisco, Utilities Equipment Corporation
Oliver B. Lyman
E. S. Moreland

Colorado, Denver, Mountain States Telephone & Telegraph Co.
W. G. Rubel

Illinois, Chicago, Hoosier Engineering Company
C. E. Bland
F. W. Fackler

Illinois, Chicago, Sargent & Lundy
Harry Barnhill
George A. Hausske
Francis H. Hollister (Wilmette, Ill.)
Leslie L. Perry (Wilmette, Ill.)
Frank V. Smith
Franklin D. Troxel

Illinois, Chicago, Spooner & Merrill, Inc.
Donald M. Cook
Chas. W. Spooner

Massachusetts, Boston, New England Telephone & Telegraph Co.
LeRoy B. Gould

Minnesota, Minneapolis, Page & Hill Company
Floyd C. Treat (Chicago, Ill.)
Rodgers G. Wheaton (Boston, Mass.)

New York, New York, The Foundation Company
L. F. Giblin
W. M. Steele

New York, New York, Goodwin, Morton & Badrian, Inc.
B. Badrian

New York, New York, International Standard Electric Corporation
William H. Capen

New York, New York, The Joslyn Company
E. L. Morier

New York, New York, New York Journal of Commerce
Raymond H. Orr

New York, New York, Semet-Solvay Engineering Corporation
Alfred Fischer

New York, New York, Stevens & Wood, Inc.
A. E. Kriegsmann

New York, New York, Trojan Engineering Corporation
Albert C. Grein

Pennsylvania, Philadelphia, The Bell Telephone Company of Pennsylvania
M. A. Bush (Warren, Pa.)
D. W. Wait (Greensburg, Pa.)

Pennsylvania, Philadelphia, United Engineers & Constructors, Inc.
E. L. Keenan
E. Dean Tanzer (Llanerch, Pa.)

Pennsylvania, Philadelphia, Welsbach Electric Street Lighting Company
Arthur E. Shaw

Pennsylvania, Pittsburgh, National Fire Proofing Company
Atwood Austin

Employees of Foreign Members (Class I)

Germany, Prussia, Berlin, Allgemeine Electrizitaets Gesellschaft
N. E. Groeneveld Meijer (Schenectady, N. Y.)

Japan, Tokyo, Electric Association of Japan
Yoshijiro Ishikawa (Osaka-City, Japan)

S. A., Brazil, Sao Paulo, Sao Paulo, The Sao Paulo Tramway, Light & Power Co., Ltd
Richard Milton Pyles

Electric Heat

(Continued from page 152)

apply it just where it is needed. Heating units can be made in any shape or size, ranging from the small one which keeps the soldering iron at the proper temperature by the consumption of about 100 watts to the large units used in industrial furnaces and consuming anywhere from 5000 to 500,000 watts.

The factor of cleanliness and improvement in other working conditions is one of those advantages which often results unexpectedly from an installation of electric heat chosen for some other more material reason. The influence on the morale of the workmen is found to be decidedly beneficial where this form of heat is employed. The shop is no longer filled with gaseous fumes; the absence of noise which attends combustion is decidedly noticeable, and the operator finds the control so simplified that his work is, in turn, simplified and made more pleasant.

Electric heat is not, and never was, a panacea, to be used wherever heat is needed. There are, and probably always will be, applications where fuel-generated heat must be used. Considered as a tool, electric heat has a definite and valuable place in industry today. Its possibilities are only just beginning to be realized.

June 3rd-7th Inclusive

52nd N. E. L. A. Convention

Exhibition Opens May 31

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Amplifier

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THE PRESIDENT'S PAGE

Convention

THE Convention—June 3 to 7—is barely two months away.

It is not just another convention.

This one never has been held before—never will be held again.

It christens the new auditorium constructed by the municipality of Atlantic City at a cost of fifteen million dollars—comfortable, commodious, convenient convention halls built according to modern plans and with the latest equipment.

There will be a new setting, a fresh outlook—on a new part of the boardwalk, opposite a new segment of the ocean.

The exhibit last year was the largest up to that time. This year the exhibit is twenty per cent larger. Because of the better facilities, it will be more accessible and more attractive than heretofore, and will present devices and improvements developed since last year.

The educational value of the exhibition alone will more than justify the time and cost of attendance.

The program of the meetings has been arranged to present the most important of the subjects engaging the immediate attention of the industry—such as regulation, rate making, research, railroad electrification, rural electrification, industrial development, engineering advance, operating methods, commercial opportunities, load building, accounting, practices, public relations and sound policies.

Some of the speakers and authors from whom acceptances have been received include Walter S. Gifford, Julius H. Barnes, W. A. Ransom, A. W. Robertson, J. R. Howard, W. J. Hagenah, Matthew S. Sloan, John W. Lieb, Charles L. Edgar, J. F. Owens, Marshall E. Sampsell, E. C. Stone, J. F. Ford, Britton I. Budd and W. H. Onken, Jr. Others of similar standing have been invited.

A special feature of each general session will be a talking motion picture bringing the form, the voice and a message of speakers of international fame. The films are now in process of being made especially for this meeting with scenario and address appropriate for this particular convention. They will be impressive and entertaining and will arouse interest and attention.

The program of Thursday's session is built around the 50th anniversary of the invention of the electric incandescent lamp.

In addition, special lighting will be arranged in the convention hall and along the boardwalk throughout the week as a part of the Golden Anniversary Jubilee of the Incandescent Lamp.

The address on public policy night will be made by a gentleman of national importance. The musical artists of the evening will be Madame Frieda Hempel and Mr. Albert Spalding.

The general business sessions will be confined to the mornings while the afternoons will be devoted to the Four National Sections, thereby avoiding overlapping of meetings and at the same time give emphasis to the work and accomplishments of each section.

All the sessions will be instructive, inspirational and entertaining. They will convene on time, move rapidly and adjourn shortly.

This has been a year of advancement and accomplishment in the industry. The convention gives opportunity to learn of the accomplishments of the past, to perfect plans for the future and to generate enthusiasm and gain inspiration for the work ahead.

If you miss this convention, you'll regret it. There'll be other conventions—but not this one ever again.

No other golden anniversary of the electric lamp—no other christening of a marvelously modern convention hall by your association—no resultant electric exhibition or business program to fit a momentous occasion—will occur again in your lifetime.

We each need now more than ever the support, help, experience, counsel, enthusiasm and fellowship of the other.

A refreshing companionship, a rejuvenating recreation, an increased knowledge and a greater appreciation of your life's work await you at the convention and exhibition of your Association at Atlantic City in June.

PSArkwright

President.

N·E·L·A· BULLETIN

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NATIONAL ELECTRIC LIGHT ASSOCIATION

A Voluntary Organization of Companies Engaged In, and Individuals Affiliated With, or Interested In, the Electric Light and Power Industry: "Organized to Advance the Art and Science of the Production, Distribution and Use of Electrical Energy for Light, Heat and Power for Public Service."

P. S. ARKWRIGHT, *President*
PAUL S. CLAPP, *Managing Director*
GEORGE F. OXLEY, *Director, Dept. of Public Information*
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The closing date for the N. E. L. A. BULLETIN is the fifteenth of the month preceding the month of issue. Material intended for publication must be in the hands of the editor by that date to insure publication the following month.

Manuscripts and correspondence relating to the N. E. L. A. BULLETIN should be addressed to the Editor, N. E. L. A. BULLETIN, 420 Lexington Ave., New York, N. Y.

The National Electric Light Association does not assume responsibility for nor necessarily endorse, or approve, statements made by individual contributors.

Code address of the National Electric Light Association is "Nelap," Bentley's code.

For the convenience of members arriving in New York after office hours or on legal holidays, the following telephone numbers connect with N.E.L.A. headquarters office:

Lexington	3300 3301 3302	Paul S. Clapp A. Jackson Marshall
Lexington	8592	George F. Oxley
Lexington	3310	Fred W. Herbert
Lexington	5059	C. E. Greenwood
Lexington	3311	E. H. Greenwood
Lexington	5035	J. O'R. Coleman and Engineering Department
Lexington	3312	Editorial Department

If the priests of the Mediaeval Age were justly canonized as Saints, Galileo, Watt, Stephenson, Morse, Bell Edison and Ford certainly deserve to be honored as gods and enshrined with Prometheus and Cadmus. They represent that which is most divine in man, namely, that creative intelligence which provides implements and makes civilization possible.—*Hu Shih.*

Preferred Voltages

THERE is general agreement on the need for standardization of system voltages and of the voltage ratings of the equipment used on these systems. There is no reason why systems should be developed for voltages not more than a few per cent apart, that can be justified on economic or engineering grounds except those of expediency. The advantages of having such systems of the same voltage are obvious, especially where they are adjacent to each other. The idea of voltage standardization appears as early as in the A. I. E. E. standardization rules of 1899, but it is only recently that those concerned have made an effective effort to coordinate all of the various considerations that must enter into a workable scheme for standard or preferred voltage ratings.

The Joint Committee of the N. E. L. A. and the N. E. M. A., which has recently reported on Preferred Voltage Ratings for A-C Systems, is to be congratulated on the successful conclusion of their assignment. The report of this Committee is to be commended not only for the preferred voltages which it establishes, but also for the successful way in which all of the factors entering the problem have been coordinated in a comprehensive scheme. The indications are that the preferred voltages recommended in this report will result in a substantial simplification of the ratings of electrical systems, with their associated apparatus.

Mass Production

THE fundamental principle of American industrial expansion is mass production — consolidation into large operating units with production concentrate in efficient and large plants. This is strikingly illustrated by U. S. Census figures on power production, summarized herein. These figures are tangible evidence of the results of consolidation and unification which have taken place during the past decade, most of which has been made possible by the financial resources of the holding companies.

At the end of 1922, the systems serving the United States comprised 3774 commercial enterprises and 2581 municipal plants, making a total of 6355. Five years later, at the end of 1927, the number of commercial enterprises had decreased to 2135—a disappearance of 1639, or of 44 per cent—while the number of municipal plants had decreased to 2192—a disappearance of 389, or of 15 per cent. A grand total of 2028 enterprises have thus been consolidated and unified during this five-year period —a process explained by the United States Bureau of the Census as being "due to the centralization of ownership or control and the absorption of independent generating stations accompanying the extension of transmission lines" in the case of commercial systems, and "to the abandonment of municipal generating stations and the acquisition of municipal distribution lines by commercial systems" in the case of municipal plants.

A similar, striking decrease is shown in the number of power houses during this five-year period, although the total installed capacity of the generating equipment has shown a very large growth. At the end of 1922, there were 5444 power plants devoted to the service of electricity supply and their total capacity was 14,313,438 kilowatts. At the end of 1927, the number of power plants had decreased to 4387—a loss of 1057, or of 19 per cent. At the same time, their total capacity stood at 25,802,530 kilowatts, an increase of 80 per cent. The replacement of the smaller and isolated power houses by coordinated systems of greater size and more efficient operation is graphically illustrated by taking the average size of the power houses in these two years.

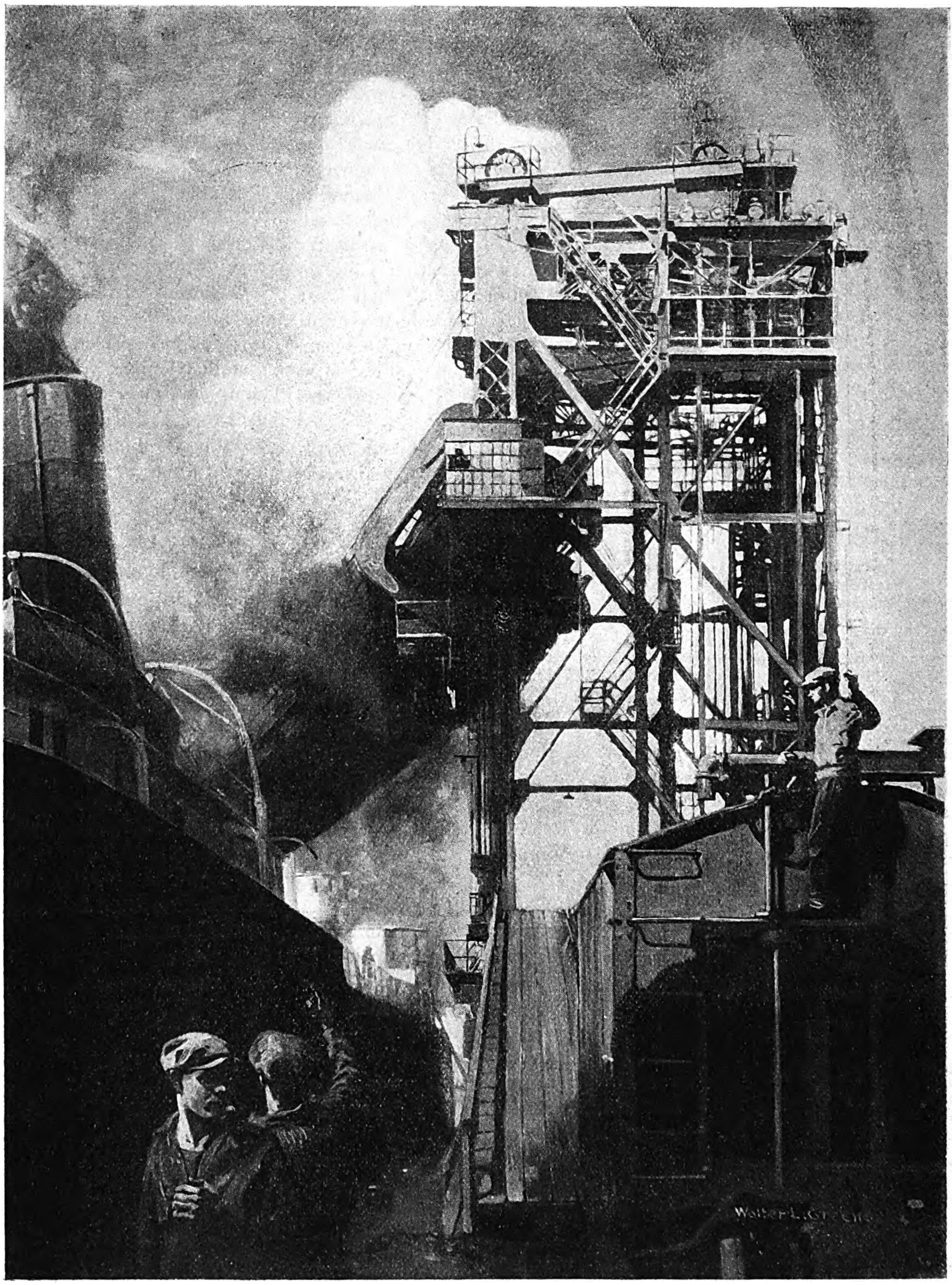
In 1922, the average generating plant in the United States had an installed capacity of 2628 kilowatts; in 1927, this figure had grown to 5880 kilowatts. In other words, although the number of power houses has declined by one-fifth, their average size has more than doubled during the past five years.

Indexes

WE have a communication from John Cotton Dana, Librarian of the Public Library of Newark, N. J., which reads in part:

"The N. E. L. A. BULLETIN is fully indexed—every issue, as soon as published—in a set of cards, which brings ready to hand any article on any subject in the BULLETIN, or in any one of 1700 other journals in all languages. This Engineering Index Service, instituted in January, 1928, is to be found in the public libraries of Newark, Cleveland, Bridgeport, Baltimore and the John Crerar Library, Chicago.

While on the subject, it may be worth pointing out that articles in the BULLETIN are also currently indexed in each issue of the *Journal of Land and Public Utility Economics*, the *Industrial Arts Index*, published by the H. W. Wilson Company, *The Engineering Index*, published by the American Society of Mechanical Engineers, and in the *American Economic Review*, published by the American Economic Association.


Walter L. Greene

From a painting by Walter L. Greene

Life Made Easy for the Black Gang by Electricity's Mighty Sinews

N·E·L·A·
BULLETIN

April, 1929 Vol. XVI No. 4

The Convention and Exhibition

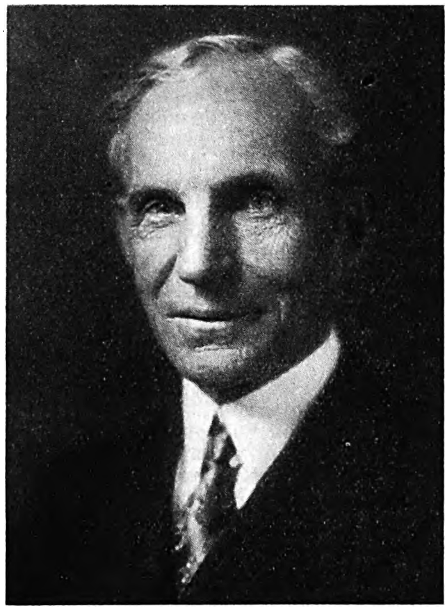
A refreshing companionship, a rejuvenating recreation, an increased knowledge and a greater appreciation of your life's work await you at the Convention and Exhibition of your Association at Atlantic City in June

WITH the Convention and Exhibition hardly more than a month away, reservations are pouring into the Atlantic City hotels in unprecedented numbers, indicating that the 52nd Convention will surpass all others in attendance as well as in diversity and magnitude of program. Approximately ten thousand registrants has been the maximum number for any previous convention. The superior program for this year and the many unusual features are expected to attract a much greater attendance.

PRESIDENT ARKWRIGHT, the Convention and Exhibition Committees and Headquarters Staff are making every effort to prepare the stage for a demonstration of economic and social progress worthy of the industry.

The most important subjects engaging the attention of the electrical industry, including regulation, research, rate making, industrial development, engineering advance, rural electrification, operating methods, railroad electrification, commercial opportunities, load building, accounting practices, public relations and sound policies, will be discussed by leading men of the industry, and a number of speakers of international reputation in other fields of business and cultural activities will also be present.

Some of those who have already accepted places on the program are: Julius H. Barnes, Walter S. Gifford, Matthew S. Sloan, John W. Lieb, Marshall E. Sampsell, Britton I. Budd, W. A. Ransom, A. W. Robertson, J. R. Howard, W. J. Hagenah, Charles E. Edgar, J. F. Owens, E. C. Stone, J. F. Ford and W. H. Onken, Jr.



HENRY FORD
who will appear at the 52nd Convention of the Association

Among the many prominent men of affairs who will attend the Convention is Henry Ford whose friendship with Mr. Edison has inspired his keen interest in the collecting of early types of electrical apparatus which will form a part of the Ford Museum of Americana at Dearborn, Mich.

Among the features of the Convention will be talking motion pictures at each session presenting messages from dignitaries of international fame, another motion talking picture entitled "The Romance of Power," filmed especially for the Convention; spectacular displays and uses of electrical wonders among the exhibits, a great Festival of Light contributed by Atlantic City, the dedication of the new $15,000,000 Atlantic City Convention Hall, and the inauguration of Light's Golden Jubilee.

There will be over two hundred interesting and instructive exhibits shown in the huge auditorium of the Atlantic City Convention Hall—the exhibits will be presented in a magnificant setting. The new Convention Hall will be dedicated and the exhibits opened Friday, May 31.

GENERAL SESSIONS will be held on the morning of Tuesday, June 4, Wednesday, June 5, Thursday, June 6, and Friday, June 7. These sessions will convene promptly at 10 a. m. Section Sessions will be held in the afternoons, beginning at 3 o'clock. Accounting and Engineering Sessions will be held in parallel Tuesday; Commercial Session, Wednesday afternoon; Public Relations Session, Thursday afternoon. Please note that the Commercial Session will be held on Wednesday afternoon and the Engineering

Session on Tuesday instead of vice versa as previously announced. The Public Policy Session will be held Thursday evening instead of Wednesday evening as at previous conventions.

The entertainment features at the Convention will be of the highest order, an outline of what is planned appearing elsewhere in this issue.

Many thousands of persons will attend the formal dedication of the Municipal Auditorium on Friday, May 31, which is the day following Memorial Day, and thousands will spend the week-end at Atlantic City. If hotel accommodations are desired prior to Monday, June 3, immediate application should be made.

Heavy railroad movement to Atlantic City suggests early action to secure reservations. The Transportation Circular sent to all members tells about train schedules, rates, etc. Don't overlook the Identification Certificate which must be used to obtain reduced convention rates.

The Transportation Committee has arrangements with the several Passenger Associations in the United States to allow all delegates, including dependent members of their families, a reduced railroad fare of a fare-and-a-half for the round trip on the Identification Certificate Plan from all points in the United States.

AN additional concession which will appeal to many delegates has also been obtained. If you wish to remain in the East for a period in excess of the return limit granted on the certificate and will indicate to your agent when purchasing your ticket, you may, by paying a fare and three-fifths, obtain a ticket with return limit thirty days from date of sale. Be sure to specify when you purchase your ticket, fare and one-half, fare and three-fifths, or Summer Tourist. Any of these types of tickets may be obtained.

It is the desire of the Transportation Committee to be of effective assistance in every possible way to delegates attending the Convention. The personnel of the Transportation Committee appears on page 200. It is the wish of this committee to assist you in securing the accommodations you desire and to help in arranging for special Pullman cars to include accommodations for those delegates who may come from remote points and who desire to travel to the Convention together. The nearest assistant traffic manager will gladly assist you in this connection.

Each member of the Association should have received the latter part of March circulars giving complete information on hotels and transportation facilities, and also reservation blanks. If these were not received or have been misplaced, please notify the Secretary of the Association, 420 Lexington Avenue, New York, N. Y.

In the hotel circular is reproduced a list of Atlantic City hotels, giving information as to the character of accommodations offered, the range of prices and location of hotels. To secure accommodations, members and guests should use the blank which accompanied circular indicating first, second and third choice of hotels, detach and mail directly to hotel of first choice. If such hotel cannot furnish the desired accommodations, it will immediately forward the application to the Hotel Committee, which will endeavor to make reservation at hotel of second and third choice. All hotels have been instructed to acknowledge all reservations directly to the persons applying for them.

It is imperative that definite date of arrival, hour of arrival and date of departure be given on application. This information will enable the com-

CONVENTION AND EXHIBITION CALENDAR

Friday, May 31st:

Exhibition will be opened at 6:00 P.M. for inspection by delegates and general public from the balcony of the Municipal Auditorium.
(Note: Visitors will not be admitted to the exhibition floor on Friday evening.)
Municipal Auditorium Dedication. Program to be announced later.

Saturday, June 1st:

Registration will open at 10:00 A.M.
Exhibition will open at 12 noon to delegates and general public, remaining open that afternoon and evening.

Sunday, June 2nd:

Registration will open at 2:30 P.M.
Exhibition will open at 12 noon to delegates and general public, remaining open that afternoon and evening.

Monday, June 3rd:

Registration will open at 8:30 A.M.
Exhibition will open at 9:00 A.M. to delegates and guests only, remaining open that morning and afternoon.
The President's Reception at 9:00 P.M. to be followed by dancing.

Tuesday, June 4th:

Registration will open at 9:00 A.M.
Exhibition will open at 9:00 A.M. to delegates and guests only, remaining open that morning and afternoon.
First General Session at 10:00 A.M.
Accounting National Section Session at 3:00 P.M.—Chelsea Hotel.
Engineering National Section Session at 3:00 P.M.
Seaview Day entertainment for the ladies.
Dancing in the evening.

Wednesday, June 5th:

Registration will open at 9:00 A.M.
Exhibition will open at 9:00 A.M. to delegates and guests only, remaining open that morning and afternoon.
Second General Session at 10:00 A.M.
Commercial National Section Session at 3:00 P.M.
Card Game for ladies in afternoon.
Entertainment and Dancing in evening.

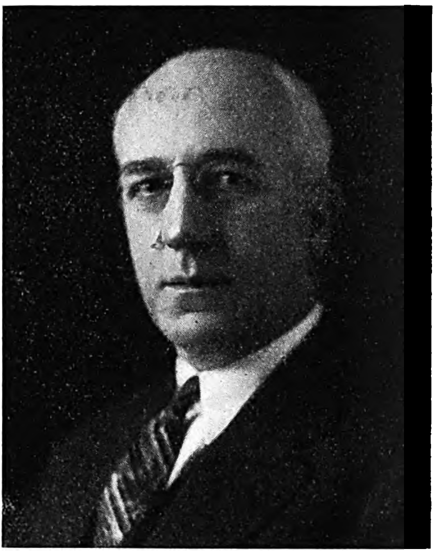
Thursday, June 6th:

Registration will open at 9:00 A.M.
Exhibition will open at 9:00 A.M. to delegates and guests only, remaining open that morning and afternoon.
Third General Session at 10:00 A.M.
Public Relations National Section Session at 3:00 P.M.
Public Policy Committee Session at 9:00 P.M. Dancing at conclusion of this Session.

Friday, June 7th:

Registration will open at 9:00 A.M.
Exhibition will open at 9:00 A.M. to delegates and guests only, remaining open until 1:00 P.M.
Fourth General Session at 10:00 A.M.
Convention adjournment about 1:30 P.M.

THOMAS W. MARTIN
Honorary Chairman, Convention General Committee



P. S. ARKWRIGHT
Chairman, Convention General Committee

mittee to arrange accommodations for other members and guests accordingly.

Hotels cannot be expected to hold reservations made by members and guests who fail to register before 6 p.m. on the day for which they have been reserved unless the time of arrival is clearly indicated and rooms paid for in event that they are not used.

It is important that hotel applications be made promptly. The Hotel Committee, whose personnel is listed on page 200, will be pleased to render any service possible.

As President Arkwright says elsewhere in this issue, "A refreshing companionship, a rejuvenating recreation, an increased knowledge and a greater appreciation of your life's work await you at the Convention."

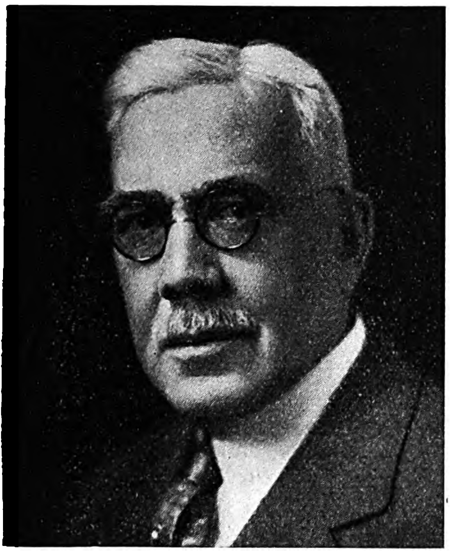
Lighting the Convention Hall

ATLANTIC CITY'S new convention hall, which is to be formally opened for the N. E. L. A. Convention and Exhibition, is the largest in the world and will be supplied with the most modern and effective lighting equipment obtainable. Novel equipment designed especially for this huge auditorium will give unusual color lighting effects as well as high intensity and easy control.

The Auditorium, in which 40,000 persons can be seated, measures approximately 300 to 480 feet, over which extend eight trusses and the half sides of two others, all of these supporting the roof and being 135 feet above the floor at highest point. Inside of these trusses, which are twelve feet wide, are placed 1500-watt floodlighting projectors spaced about 14 feet apart. They project light to the ceiling, which is finished in celotex and aluminum paint.

Thirty color screens are geared to small motors so that one-half these screens are operated on each side. To obtain any color desired a button is pushed on the stage and the screens stop with a two-foot opening in front of the projectors. About 540 projectors are used. Openings in front of them are also equipped with prismatic diffusing plates. A pilot light system and dimmer control method is incorporated to operate all equipment from the stage.

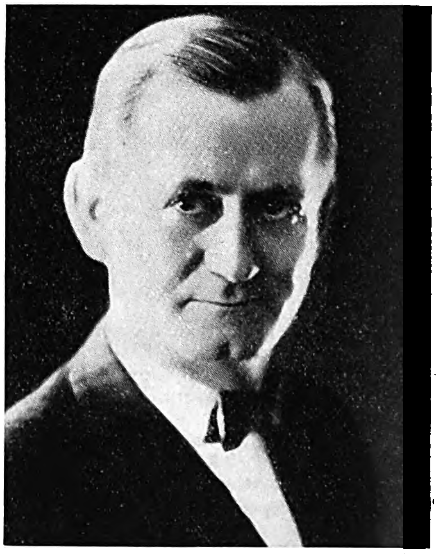
(*Continued on page 204*)



E. W. GOLDSCHMIDT
Chairman, Exhibition Committee

THOMAS SPROULE
Chairman, Entertainment Committee

ROSS I. PARKER
Chairman, Transportation Committee



C. H. HOWELL
Chairman, Hotel Committee

1929 Convention and Exhibition Committees

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Chairman, P. S. Arkwright, Georgia Power Co., Atlanta, Ga.
Vice-Chairman, M. S. Sloan, The New York Edison Co., New York, N. Y.
Vice-Chairman, W. A. Jones, Henry L. Doherty & Co., New York, N. Y.
Vice-Chairman, J. F. Owens, Oklahoma Gas & Electric Co., Oklahoma City, Okla.
Vice-Chairman, Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.
Vice-Chairman, P. S. Young, Public Service Electric & Gas Co., Newark, N. J.

R. H. Ballard, Southern California Edison Co., Los Angeles, Cal.
Paul S. Clapp, National Electric Light Association, New York, N. Y.
J. F. Ford, The Philadelphia Electric Co., Philadelphia, Pa.
E. W. Goldschmidt, Wagner Electric Corp., New York, N. Y.
C. H. Howell, Atlantic City Electric Co., Atlantic City, N. J.
A. Jackson Marshall, National Electric Light Association, New York, N. Y.
Ross I. Parker, General Electric Co., Chicago, Ill.
Thomas Sproule, Public Service Electric & Gas Co., Newark, N. J.
E. C. Stone, Duquesne Light Co., Pittsburgh, Pa.

HOSTESSES

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Mrs. P. S. Arkwright, *Chairman*
Mrs. M. S. Sloan, *Vice-Chairman*
Mrs. W. A. Jones, *Vice-Chairman*
Mrs. J. F. Owens, *Vice-Chairman*
Mrs. Marshall E. Sampsell, *Vice-Chairman*
Mrs. P. S. Young, *Vice-Chairman*
Mrs. R. H. Ballard
Mrs. J. F. Ford
Mrs. E. W. Goldschmidt
Mrs. C. H. Howell
Mrs. A. Jackson Marshall
Mrs. Ross I. Parker
Mrs. Thomas Sproule
Mrs. E. C. Stone

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Secretary, W. F. Tait, Public Service Electric & Gas Co., Newark, N. J.

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W. J. Clark, Westchester Lighting Co., Mt. Vernon, N. Y.
Frank H. Gale, General Electric Co., Schenectady, N. Y.
C. H. Howell, Atlantic City Electric Co., Atlantic City, N. J.
Clarence L. Law, The New York Edison Co., New York, N. Y.
James H. McGraw, Jr., McGraw-Hill Co., New York, N. Y.
J. C. McQuiston, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
F. X. Monville, The Philadelphia Electric Co., Philadelphia, Pa.
C. L. Peirce, Jr., Hubbard & Co., Pittsburgh, Pa.
George Rumsey, Rumsey Electric Co., Philadelphia, Pa.
R. E. Swift, Atlantic City Electric Co., Atlantic City, N. J.

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Secretary-Treasurer, Frank H. Gale, General Electric Co., Schenectady, N. Y.

Edwin L. Andrew, Rome Wire Co., Rome, N. Y.
S. E. Doane, National Lamp Works of G. E. Co., Cleveland, Ohio
E. D. Doty, Frigidaire Corp., Dayton, Ohio
J. J. Greene, Johns-Manville Corp., New York, N. Y.
George A. Hughes, Edison Electric Appliance Co., Inc., Chicago, Ill.
J. C. McQuiston, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
C. L. Peirce, Jr., Hubbard & Co., Pittsburgh, Pa.

HOTEL COMMITTEE

Chairman, C. H. HOWELL, Atlantic City Electric Co., Atlantic City, N. J.
Secretary, S. F. Delany, Atlantic City Electric Co., Atlantic City, N. J.

TRANSPORTATION COMMITTEE

Chairman, ROSS I. PARKER, General Electric Co., Chicago, Ill.

P. H. Nabors, Georgia Power Co., Atlanta, Ga.
C. B. Burleigh, General Electric Co., Boston, Mass.
J. E. Kearns, General Electric Co., Chicago, Ill.
H. N. Sibbald, National Lamp Works of G. E. Co., Cleveland, Ohio
J. E. Van Horn, Texas Power & Light Co., Dallas, Texas
Harry A. Snow, The Detroit Edison Co., Detroit, Mich.
A. E. Bettis, Kansas City Power & Light Co., Kansas City, Mo.
D. A. Munger, Southern California Edison Co., Los Angeles, Cal.
H. E. Young, Northern States Power Co., Minneapolis, Minn.
H. M. Lyster, 712 Power Bldg., Montreal, Can.
Frank Frost, New Orleans Public Service, Inc., New Orleans, La.
Robert B. Grove, The United Electric Light & Power Co., New York, N. Y.
J. H. Aiken, The United Electric Light & Power Co., New York, N. Y.
Melville Chandler, The United Electric Light & Power Co., New York, N. Y.
Herman Spoehrer, Union Electric Light & Power Co., St. Louis, Mo.
R. M. Alvord, General Electric Co., San Francisco, Cal.
W. D. Power, British Columbia Electric Railway Co., Ltd., Vancouver, Can.

Exhibition Will Provide Fine Show of Electrical Apparatus

MORE than two hundred manufacturing companies will provide at the Exhibition, which will open on May 31, three days in advance of the Convention, an unparalelled display of the most recent advances in the manufacture of electrical apparatus and equipment of all kinds. The exhibit will be 20 per cent larger than that of last year, and because of better facilities it will be more accessible and more attractively arranged. The great size of the Auditorium of Atlantic City Convention Hall will permit of a more homogeneous arrangement of the displays, and do away with the confusion incidental to exhibits displayed under less favorable conditions. It will be possible to view the whole exhibit from the balcony above the Auditorium.

A carefully prepared descriptive catalog of the exhibits with diagrams showing the exact location of each, will be given to those attending the Convention, thus further obviating any chance of confusion.

Although the Convention itself will not be formally opened until Monday, June 3, the Exhibition will open on Friday, May 31, at 6 p. m. This is to give the general public as well as architects, builders and others directly interested in electrical equipment, an opportunity to view a collection of electrical apparatus such as has never before been collected under one roof. This Exhibition in this way will provide an educational opportunity of great importance.

To indicate the diversity of the exhibit, a few of the articles and displays to be on view are chosen at random:

Power plant equipment.
Turbines.
Generators.
Hydro-electric apparatus.
Aviation field lighting equipment.
Remote control equipment.
Pole line equipment.
Metals.
Domestic lighting.
Commercial lighting.
Street lighting.
Flood lighting.
Domestic appliances of all descriptions.
Electric ranges.
Electric refrigerators.
Water and house heating equipment.
Radio sets and equipment.
First-aid kits and supplies.
Cable and wire.
Electric signs.
Accounting machinery.
Valves, pipes and fittings.
Batteries.
Safety appliances.
Pulverized coal equipment.
Steam generating equipment.
Underground conduit and construction.
Incubators and brooders.
Medical apparatus.
Rural electrification displays.
Motors.
Switches.
Fire protection equipment.
Transmission towers.
Maintenance tools.
Elevator equipment.

While this list is by no means complete, it will at least indicate the wide range of the exhibits. In the following columns a list of exhibitors, corrected to time of going to press, is shown.

LIST OF EXHIBITORS AT 1929 EXHIBITION

(Corrected to date of going to press)

NAME	ADDRESS
Air Preheater Corporation	New York, N. Y.
Alberene Stone Company	New York, N. Y.
Allen-Bradley Company	Milwaukee, Wis.
Allis-Chalmers Mfg. Company	Milwaukee, Wis.
Altorfer Brothers Company	Peoria, Ill.
Aluminum Company of America	Pittsburgh, Pa.
American Brass Company	Waterbury, Conn.
American Brown Boveri Electric Corp.	New York, N. Y.
American Electrical Heater Co.	Detroit, Mich.
American Engineering Company	Philadelphia, Pa.
American-LaFrance & Foamite Industries, Inc.	Utica, N. Y.
American Steel & Wire Company	Chicago, Ill.
Anaconda Copper Mining Company	Waterbury, Conn.
Albert & J. M. Anderson Mfg. Co.	New York, N. Y.
Apex Electrical Mfg. Company	Cleveland, Ohio
Armstrong Electric & Mfg. Corp.	Huntington, W. Va.
Asbestos Shingle, Slate & Sheathing Co.	Ambler, Pa.
Associated Gas & Electric Company	New York, N. Y.
Atwater Kent Mfg. Company	Philadelphia, Pa.
Automatic Electric Heater Company	Philadelphia, Pa.
Automatic Washer Company	Newton, Iowa
Bailey Meter Company	Cleveland, Ohio
Bartlett Manufacturing Company	Detroit, Mich.
Walter Bates Steel Corporation	Gary, Ind.
Benjamin Electric Mfg. Company	Chicago, Ill.
Bennett-Watts-Haywood Company	New York, N. Y.
James G. Biddle	Philadelphia, Pa.
Blackstone Mfg. Company	Jamestown, N. Y.
Blaw-Knox Company	Pittsburgh, Pa.
Bohn Refrigerator Company	St. Paul, Minn.
Brown Company	Portland, Me.
Buckeye Twist Drill Co.	Alliance, Ohio
Buda Company	Harvey, Ill.
Bullard-Davis, Inc.	New York, N. Y.
Burndy Engineering Company, Inc.	New York, N. Y.
Burroughs Adding Machine Co.	Detroit, Mich.
Business News Publishing Co.	Detroit, Mich.
Case-Shepperd-Mann Publish. Co.	New York, N. Y.
Central Flatiron Mfg. Company	Johnson City, N. Y.
Century Electric Company	St. Louis, Mo.
Champion Switch Company	Kenova, W. Va.
Chance Company	Centralia, Mo.
Chicago Flexible Shaft Company	Chicago, Ill.
Cinderella Appliances Corporation	New York, N. Y.
Cinderella Washing Machine Co.	Cleveland, Ohio
Circle F Manufacturing Company	Trenton, N. J.
Clark Electric Water Heater Division of McGraw Electric Company	Omaha, Neb.
Colt's Patent Fire Arms Mfg. Co.	Hartford, Conn.
Combustion Engineering Corporation	New York, N. Y.
Conover Company	Chicago, Ill.
Cooper Hewitt Electric Co.	Hoboken, N. J.
Copeland Sales Company	Detroit, Mich.
Copperweld Steel Company	Glassport, Pa.
Corning Glass Works	New York, N. Y.
R. W. Cramer & Company, Inc.	New York, N. Y.
Crane Company	Chicago, Ill.
Curtin-Howe Corporation	New York, N. Y.
Dampney Company of America	Boston, Mass.
Davey Tree Expert Company	Kent, Ohio
DeLaval Separator Company	New York, N. Y.
Delta-Star Electric Company	Chicago, Ill.
Doble Engineering Company	Medford Hillside, Mass.
Dover Mnaufacturing Co.	Dover, Ohio
Duncan Electric Mfg. Company	Lafayette, Ind.

NAME	ADDRESS
Thomas A. Edison, Inc.	Orange, N. J.
Edison Electric Appliance Co., Inc.	Chicago, Ill.
Electric Machinery Mfg. Company	New York, N. Y.
Electric Power Equipment Corp.	Philadelphia, Pa.
Electric Service Supplies Co.	Philadelphia, Pa.
Electric Storage Battery Co.	Philadelphia, Pa.
Electric Vacuum Cleaner Co.	Cleveland, Ohio
Electrical Research Products, Inc.	New York, N. Y.
Electrical Testing Laboratories	New York, N. Y.
Electrol, Inc.	St. Louis, Mo.
Engineering Products Corporation	New York, N. Y.
Estate Stove Company	Hamilton, Ohio
Eureka Vacuum Cleaner Company	New York, N. Y.
Federal Electric Company	Chicago, Ill.
Fitzgerald Manufacturing Co.	Torrington, Conn.
B. C. Forbes Publish. Co., Inc.	New York, N. Y.
Four Wheel Drive Auto Co.	Clintonville, Wis.
Franklin Air Compressor Corp.	Norristown, Pa.
Frigidaire Corportaion	Dayton, Ohio
Fuller Lehigh Company	Fullerton, Pa.
G & W Electric Specialty Co.	Chicago, Ill.
Gage Publishing Company, Inc.	New York, N. Y.
Gainaday Electric Company	Pittsburgh, Pa.
P. A. Geier Company	Cleveland, Ohio
General Appliance Corporation	New York, N. Y.
General Electric Company	Schenectady, N. Y.
General Office Equipment Corp.	New York, N. Y.
General Outdoor Advertising Co., Inc.	New York, N. Y.
G. M. Gest	New York, N. Y.
Giant Manufacturing Co.	Council Bluffs, Iowa
Gillinder Brothers, Inc.	Port Jervis, N. Y.
Graybar Electric Company	New York, N. Y.
Edwin F. Guth Company	St. Louis, Mo.
Habirshaw Cable & Wire Corp.	New York, N. Y.
Hall Electric Heating Co., Inc.	Philadelphia, Pa.
Hankscraft Company	Madison, Wis.
Hanovia Chemical & Mfg. Co.	Newark, N. J.
Hoe Corporation	Poughkeepsie, N. Y.
Holophane Company, Inc.	New York, N. Y.
Hoover Company	Chicago, Ill.
Hubbard & Company	Pittsburgh, Pa.
Hurley Machine Company	Chicago, Ill.
Hynes & Cox Electric Corp.	Albany, N. Y.
Ingersoll-Rand Company	New York, N. Y.
International Business Machines Corp.	New York, N. Y.
International Nickel Company, Inc.	New York, N. Y.
Ironrite Ironer Company	Detroit, Mich.
I-T-E Circuit Breaker Company	Philadelphia, Pa.
Jeffery-Dewitt Insulator Company	Kenova, W. Va.
Johns-Manville Corporation	New York, N. Y.
Paul E. Johnson, Inc.	Chicago, Ill.
Kayline Company	Cleveland, Ohio
James R. Kearney Corporation	St. Louis, Mo.
Kelvinator Sales Corporation	Detroit, Mich.
Kempton Manufacturing Corp.	New York, N. Y.
Kerite Insulated Wire & Cable Co., Inc.	New York, N. Y.
Walter Kidde & Company, Inc.	New York, N. Y.
Knott & Garllus Company	Detroit, Mich.
Kuhlman Electric Company	Bay City, Mich.
Kulp Theft Proof Lamp Company	Chicago, Ill.
Landers, Frary & Clark	New Britain, Conn.
Landis & Gyr, Inc.	New York, N. Y.
Lapp Insulator Co., Inc.	LeRoy, N. Y.
Leeds & Northrup Company	Philadelphia, Pa.
Leonard Refrigerator Company	Grand Rapids, Mich.
Lighting Fixtures & Lighting	New York, N. Y.
Lightolier Company	New York, N. Y.
A. J. Lindemann & Hoverson Co.	Milwaukee, Wis.
Line Material Company	South Milwaukee, Wis.
Locke Insulator Corporation	Baltimore, Md.
W. J. Loth Stove Company, Inc.	Waynesboro, Va.
Macbeth-Evans Glass Company	Charleroi, Pa.
Malleable Iron Fittings Company	Branford, Conn.
Manning, Bowman & Company	Meriden, Conn.
W. N. Matthews Corporation	St. Louis, Mo.
May Oil Burner Corp.	Baltimore, Md.

NAME	ADDRESS
Metal Ware Corporation	Two Rivers, Wis.
Metropolitan Device Corp.	Brooklyn, N. Y.
Mica Insulator Company	New York, N. Y.
Mine Safety Appliances Company	Pittsburgh, Pa.
Moloney Electric Company	St. Louis, Mo.
McGraw-Hill Publishing Co.	New York, N. Y.
National Carbon Company	Cleveland, Ohio
National Electric Products Corp.	Pittsburgh, Pa.
Noma Electric Corporation	New York, N. Y.
Ocean Accident & Guarantee Corp., Ltd.	New York, N. Y.
Ohio Brass Company	Mansfield, Ohio
Okonite Company	New York, N. Y.
Okonite-Callender Cable Co.	New York, N. Y.
Oliver Iron & Steel Co.	Pittsburgh, Pa.
One Minute Manufacturing Co.	Newton, Iowa
Otis Elevator Company	New York, N. Y.
Pacific Electric Manufacturing Co.	San Francisco, Cal.
Panelyte Corporation	Trenton, N. J.
Park Metalware Company, Inc.	Orchard Park, N. Y.
Peerless Insulated Wire & Cable Co.	New York, N. Y.
Peninsular Stove Company	Detroit, Mich.
Permutit Company	New York, N. Y.
Philadelphia Electrical & Mfg. Co.	Philadelphia, Pa.
Philadelphia Storage Battery Co.	Philadelphia, Pa.
Porcelain Insulator Corp.	Lima, N. Y.
Portable Light Company, Inc.	New York, N. Y.
Power Plant Engineering	Chicago, Ill.
Prima Manufacturing Co., Inc.	Philadelphia, Pa.
Products Protection Corporation	New York, N. Y.
Public Service Electric & Gas Co.	Newark, N. J.
Public Utilities Reports, Inc.	Washington, D. C.
Railway & Industrial Engineering Co.	Greensburg, Pa.
Rainbow Appliance Corporation	Rochester, N .Y.
Rawlplug Company, Inc.	New York, N. Y.
Riter-Conley Co.	Pittsburgh, Pa.
Roberts & Mander Stove Co.	Philadelphia, Pa.
Robeson Rochester Co.	Rochester, N. Y.
Rockbestos Products Corporation	New Haven, Conn.
Rome Wire Company	Rome, N. Y.
St. Louis Malleable Casting Company	St. Louis, Mo.
W. H. Salisbury & Company, Inc.	Chicago, Ill.
Sangamo Electric Company	New York, N. Y.
Savage Arms Corporation	New York, N. Y.
Schweitzer & Conrad, Inc.	Chicago, Ill.
Seeger Refrigerator Company	St. Paul, Minn.
Serelco, Inc.	New York, N. Y.
Servel Sales, Inc.	Evansville, Ind.
Seth Thomas Clock Co.	New York, N. Y.
Seyler Mfg. Co.	Pittsburgh, Pa.
Wellington J. Smith Company	Cleveland, Ohio
South Bend Current Controller Co.	South Bend, Ind.
Standard Sanitary Mfg. Co.	Pittsburgh, Pa.
Standard Underground Cable Co.	Pittsburgh, Pa.
States Company	Hartford, Conn.
Superheater Company	New York, N. Y.
Swartzbaugh Mfg. Company	Toledo, Ohio
R. Thomas & Sons Company	Lisbon, Ohio
Tork Clocks, Inc.	New York, N. Y.
Transelectric Company	Indianapolis, Ind.
Union Metal Mfg. Company	Canton, Ohio
Utilities Publication Company	Chicago, Ill.
Wadsworth Electric Mfg. Co.	Covington, Ky.
Wagner Electric Corporation	St. Louis, Mo.
Walker & Pratt Mfg. Corporation	Boston, Mass.
P. Wall Mfg. Supply Company	Pittsburgh, Pa.
Warren Telechron Company	Ashland, Mass.
Waterbury Cable Service, Inc	New York, N. Y.
Waters-Genter Company	Minneapolis, Minn.
Welsbach Company	Gloucester City. N. J.
Westinghouse Electric & Mfg. Co.	East Pittsburgh, Pa.
Weston Electrical Instrument Corp.	Newark, N. J.
Whirldry Corporation	New Haven, Conn.
W. S. Wilson Corporation	New York, N. Y.
Wright Appliance Company, Inc.	Philadelphia, Pa.
M. S. Wright Company	Worcester, Mass.

Light's Golden Jubilee to Be Inaugurated at N. E. L. A. Convention

THE international celebration of the Golden Jubilee of Light—marking the 50th anniversary of the invention of the incandescent light bulb by Thomas Edison—will be inaugurated in Atlantic City, beginning on the evening of Friday, May 31, the inauguration festivities to continue throughout the 52nd convention and exhibition of the N. E. L. A.

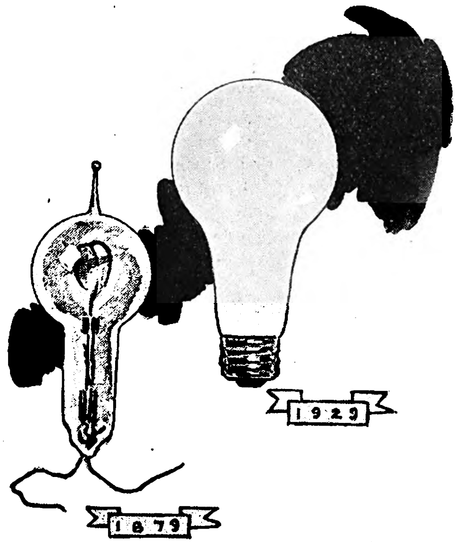
In addition to opening the world-wide festival of light, the event will initiate a brilliant light display throughout the entire resort and approaching highways, to last until Oct. 21, the anniversary date.

It will also mark the beginning of an official celebration of Atlantic City's Diamond Anniversary as a duly incorporated community, as well as formal opening of the Atlantic City Auditorium in which the N. E. L. A. convention and exhibition will be held—the largest convention hall in the world.

This year marks the 50th of fifty golden years of lighting and electrical progress. And Oct. 21, 1929, will mark the 50th anniversary of Thomas A. Edison's invention of the first practical incandescent lamp, the very cornerstone over which the electrical industry has raised itself.

This golden year, then, and that golden day offer not only the vast lighting industry but the entire civilized world that long-waited-for opportunity to pay a fitting personal tribute to the master inventor for the greatest of all his gifts to mankind, and that opportunity to celebrate fittingly the 50th birthday of the incandescent lamp, both with Light's Golden Jubilee.

According to extensive plans already taking shape, Light's Golden Jubilee will be just as much an occasion for serious retrospect, profound appreciation and genuine inspiration as it will be a celebration, gala, festive and jubilant. It will be a celebration exclusive to no one company, to no one industry, nor will it be limited to any single nation. It is upon the people of the world, upon a grateful people, that the blessings of Edison have been showered. Light's Golden Jubilee offers the electrical trade a golden opportunity to join hands with the world at large in standing beside the man who gave the world light without flame, the man whose life is an inspiration to all, the man who stands for all that is American and good. Individually and collectively the men of the electrical industry owe it to themselves to make Light's Golden Jubilee the greatest tribute ever paid a living man.



Light's Golden Jubilee received its first formal suggestion on Edison's 82nd birthday. At a luncheon of the Edison Pioneers, those men who were associated with Edison in his pioneering days, their fellow member, John W. Lieb, tentatively outlined the celebration. The Pioneers then unanimously approved the following resolution:

> "Resolved, that the President of the Edison Pioneers be requested, and he is hereby authorized, to appoint a committee of five from its membership to propose to the electrical industry at large the organization of a Sponsoring Committee which may prepare plans for the appropriate celebration of the Golden Jubilee of the Incandescent Lamp occurring during the year 1929."

Light's Golden Jubilee sponsoring committee, which is now being formed, will have at its disposal an adequate organization to plan, to direct, and to coordinate the many events and activities of the jubilee. It is expected that the time between now and the National Electric Light Association convention at Atlantic City in June will be devoted to crystallizing and perfecting plans and organizations, and preparing essential literature. It is the general plan to start the first of a great series of events relatively early with the thought of leading up to a tremendous climax on Oct. 21—the 50th birthday of the incandescent lamp. Oct. 21 will be "The Night of Light" and will be the occasion of a celebration and tribute to Thomas Edison which will encircle the globe and echo through the years that follow.

Light's Golden Jubilee should be the occasion for jubilee lighting festivals all over the nation. It will call upon all branches of the industry to promote the movement nationally and locally. Every retailer, wholesaler, central station and manufacturer will have a twofold opportunity—first, of active direct participation, and, second, of encouraging others to participate.

The jubilee will be magnificently supported by Henry Ford, Edison Pioneers, and close personal friends of Thomas Edison. All of Edison's original laboratories and machines are being moved to Dearborn, Mich., where Menlo Park will live again and through the years as part of the great Ford Museum of American Industry. Henry Ford's plans in connection with the jubilee celebration will be announced at a later date.

Light's Golden Jubilee makes it timely to consider the tremendous progress that has been made in lighting during the past 50 years. It may be summarized in this way:

Light one room with a 100-watt Mazda lamp for 1000 hours. Light another room to the same degree of brightness with replicas of the first commercial incandescent lamp. Pay seven cents per kilowatt-hour for current. Now light a third room just as brightly with candles, and keep replacing the candles for 1000 hours. Here would be your light bill at the end of that time:

Room 1—100-watt Mazda lamp..	$ 7.35
Room 2—Original incandescent	68.75
Room 3—Candles	1,500.00

Those figures tell the story of the greatness of Edison's gift to the world of light and 50 golden years of development which are incorporated in the Mazda lamp of today.

Light's Golden Jubilee comes at the close of one lighting era and at the introduction of a greater one. In the past the manufacturers' problem has been to make lamps fast enough, and the central stations' problem to extend power lines far enough to supply all the people with light by which to *see*. Now with the mechanical part of the job mastered, we are beginning to provide light by which to *live*. 1929 will bring gratifying strides in that direction. Light's Golden Jubilee will create a wider knowledge of and a deeper interest in lighting and electricity than has ever existed before.

This, then, save for the minute details, is Light's Golden Jubilee. The electrical industry at large owes it not only to its great chief, Edison, to stand beside the man whose genius made possible this industry and a world forever free from darkness, but to itself as well.

Light's Golden Jubilee Essay Contest

MR. N. H. BOYNTON, in charge of Sales Promotion, National Lamp Works, representing Light's Golden Jubilee Committee, offers a first prize of $150 cash and a second prize of $75 cash to the two employees of member companies of the National Electric Light Association who prepare the two best essays on "Light's Golden Jubilee" in conformity with the following rules and regulations:

1. All essays must deal with the subject, "Light's Golden Jubilee."

Note: These essays in general should briefly treat on the history of light, its successful stages of development, the invention of the incandescent lamp by Mr. Edison, what modern lighting means both to our present civilization and the electric light and power industry and through light, what the electric light and power industry has contributed to the progress of the nation.

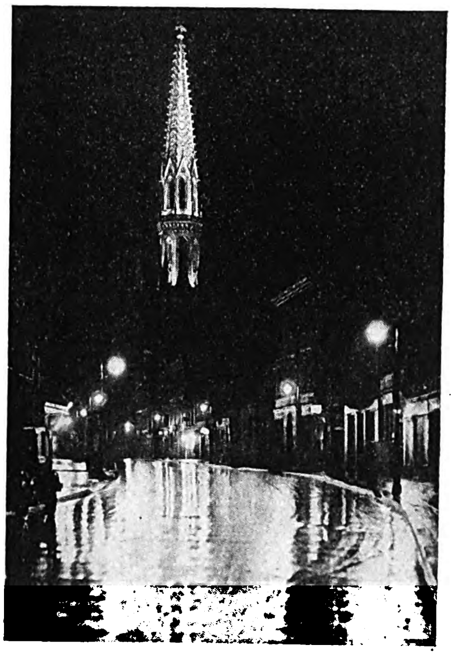
2. Any employee of a member company of the National Electric Light Association, excepting officers, managers, general office department heads and those who specialize in the sale of light, is eligible.

3. All essays must be clearly written on one side of the paper, $8\frac{1}{2}$ x 11 inches in size, and should be double spaced and, if possible, typewritten.

4. Essays should not contain more than 1500 words.

5. All essays should be mailed to W. M. Skiff, Chairman Speakers' Bureau, Nela Park, Cleveland, Ohio, so that they will be received by him on or before May 15. Any essays received after that date will be ineligible for the prize.

6. All essays should be addressed as above, marked "Essay Contest," and must be sent in a plain envelope, postage paid, with no identification marks on either the envelope or the essay, other than those described in the following paragraph.



7. Accompanying each essay must be a plain, sealed, blank envelope (no return card) inside of which shall be a 3 x 5 card bearing the name and address of the contestant, the name of the company by which he or she is employed and the department with which he or she is connected. As each essay is received it will be marked with a number and the sealed envelope accompanying it will be marked with the same identifying number. The numbered envelopes will all be filed until after the judging of the essays. On selection of the essays adjudged the winners, the envelopes bearing the corresponding numbers will be opened and the winners announced. By this method of not identifying the writers of the competing essays until after the awards have been made, absolute unprejudiced judging of all essays submitted is assured.

8. In making the award the essays will be adjudged in a uniform manner, points being allowed on the following basis:

	per cent
(a) The amount of the more important material in the essay pertaining to the subject...........	50
(b) Original thoughts and suggestions developed by the contestant, which show the mental grasp of the more important material....	35
(c) General composition of the essay —clearness, and brevity with which thoughts are expressed; neatness and appearance.......	15
	100

9. Nationally known persons are being carefully selected to act as judges and their identity will be revealed in due time.

10. The decision of the judges shall be final.

Lighting the Convention Hall

(*Continued from page* 199)

In the ballroom, which will seat 5000 and in which there is a ninety-foot ceiling, indirect color and general illumination is accomplished by cove and lunette method. A total of 136 floodlights of 250-watt size are set in arches and coves and equipped with daylight lenses. Alternate red, blue, green and other colors are obtained with many of these projectors fitted with color screens. In addition, there are 26 lunettes with 36 smaller lamps in each. Varied color effects and dimmer control are obtained from the stage. The total connected load of the convention hall will be 1442 kilowatts.

Entertainment Features of the 1929 Convention

THE 52nd Convention, from June 3 to 6, will mark the opening of Atlantic City's new municipal auditorium, and its splendid accommodations and many facilities will be used throughout the entire convention program. The spacious and beautifully decorated ballroom is particularly adaptable to our purposes in that there is a large stage at one end, which will be used for the orchestra, and a large balcony at the other, which will be appreciated by those not wishing to dance. The ballroom is larger than that of the Million Dollar Pier, and with its excellent ventilation facilities it will prove most enjoyable for all the evening entertainment.

The performance of B. A. Rolfe's orchestra last year was so satisfactory that the Entertainment Committee feels that it is quite fortunate in securing its services again. The orchestra will supply music for all the entertainment features of the Convention.

The new auditorium will be the center of activity every evening. The Convention will open Monday evening with a reception to President and Mrs. Arkwright, after which there will be dancing until midnight. On Tuesday evening there will be dancing from 8.30 until midnight. Special features, the details of which will be announced later, are to be interspersed with the dancing on Wednesday evening, which will last from 8.30 to 1 o'clock. The Public Policy Committee session will be held this year on Thursday evening. Frieda Hempel, soprano, and Albert Spalding, violinist, will be the soloists, and they, together with Mr. Rolfe's orchestra, will supplement the Public Policy program. At the conclusion of the session there will be dancing until 1 o'clock, and this will conclude the convention entertainment program.

Mr. Rolfe

Frieda Hempel

Albert Spalding

The Committee has provided entertainment for the ladies on Tuesday and Wednesday afternoons, leaving Thursday free, as at preceding conventions. Seaview Day, the first of these events planned exclusively for the ladies, will be on Tuesday. There will be an 18-hole golf tournament in the morning, and in the afternoon contests in putting, obstacle golf, croquet and dart throwing. Prizes will be given in all these events.

Tables and cards will be available to those wishing to play, but no prizes will be awarded. Tea will be served at 4.30, with music by the orchestra.

A card party has been planned for Wednesday afternoon in the Assembly Room of the Hotel Chelsea, which the Entertainment Committee feels is ideally suited to the purpose. Ladies may make up their own tables and select any card game they may wish to play. There will be prizes for each table. The orchestra will play at tea, which will be served at 4.30.

The B. A. Rolfe Orchestra, which has been engaged to furnish music for the Convention

Association's Work Reported at National Executive Committee Meeting

THE Executive Committee of the Association held a meeting March 7 at N. E. L. A. Headquarters, New York, with Vice-Chairman M. S. Sloan presiding in the absence of President Arkwright. Reports from the Geographic Divisions, the four national sections and special and general committees indicated satisfactory progress in association activities.

In the absence of Treasurer P. S. Young, Managing Director Paul S. Clapp submitted a financial statement of the association for the first seven months of the administrative year. The expenditures are well within budget appropriations. The books of the association have been audited by Price, Waterhouse & Company, certified public accountants. The collection of dues for this year is progressing satisfactorily.

Membership Committee

Chairman Howard K. Mohr reported the membership of the association as of March 6, 1929, as follows:

Class A (electric light and power companies)	752
Class B (officers or employees of Class A members)	15,286
Class C (invited members)	105
Class D (electrical manufacturing companies)	405
Class E (officers or employees of Class D members)	2,523
Class F (associate members-contractors, dealers, etc.)	405
Class G (officers or employees of Class F members)	658
Class H (foreign central station companies)	131
Class I (officers or employees of Class H members)	67
Total membership	20,332

New membership applications approved at this meeting were for Class A, 25; Class B, 1020; Class C, 1; Class D, 34; Class E, 176; Class F, 42; Class G, 80; Class H, 9; Class I, 14.

Geographic Divisions

The presidents, or their representatives, of all Geographic Divisions were present, including Canada. The committees of the divisions as a whole are satisfactorily functioning in accordance with formulated programs, under the guidance of their own executive committees.

Any slow-down in activity in particular committees was ascribed to lack of early formulation of programs. Liaison and coordination with headquarters was favorably commented on by several divisions.

Increased commercial activity is generally observed. The Canadian Division requested assistance on Codes and Standards, particularly as related to wiring. The Middle West Division emphasized improvement in accounting activity. Geographic Divisions report more intensified work toward definite objectives with tendency toward special conferences of those in a common field. Rural Electrification Conferences in Southeastern, North Central, and Southwestern Divisions were most successful. The Great Lakes Division announced plans for a corresponding conference; also for a Merchandising Conference, Chicago, March 19. The Northwest Division reported the benefits of a public speaking competition. All divisions told of their convention plans. Industry development, public attitude, and business conditions were, in general, reported to be most favorable with excellent future outlook.

Vice-President Sloan called upon Messrs. Gerard Swope, President of the General Electric Company, G. E. Cullinan, Vice-President of the Graybar Electric Company, and James R. Strong, President of the Tucker Electrical Construction Company, representative respectively of the manufacturer, wholesaler, and contractor-dealer viewpoint.

Mr. Swope stated that the general manufacturing outlook is good. He advised that the National Electrical Manufacturers Association is steadily increasing in membership, strengthening its organizational structure, and is cooperating excellently with the N. E. L. A.

Mr. Cullinan advised of strengthened associational organization among wholesalers and jobbers. Much attention is being given to increased services and facilities to both manufacturers and merchandisers.

Mr. Strong outlined the new organization plans of the Association of Electragists, International which provide for regional chapters. He commented favorably on the cooperation with the N. E. L. A., and the steady improvement in understanding between the electric light and power companies and the contractor-dealers throughout the country.

Public Relations National Section

Chairman J. F. Owens advised that the Section is well organized and that all committees are functioning. A meeting of the Section Executive Committee was held, Wednesday, March 6, with large and representative attendance.

Mr. Owens presented recommendations emanating from the Cooperation with Educational Institutions Committee, which were approved by the Executive Committee, Public Relations Section. These resolutions appear in the report of the Public Relations Executive Committee Meeting printed elsewhere in this issue.

The National Executive Committee approved the recommendations and requested that they be reported to the Public Policy Committee.

Mr. Owens submitted a recommendation from the Customer Ownership Committee, W. H. Hodge, chairman, for increased support by member companies to the National Better Business Bureau. The services of the National Better Business Bureau were recommended as providing added protection to customer-owners of public utility securities against the pressure to dispose of these holdings for speculative investments of uncertain value. The National Executive Committee endorsed the National Better Business Bureau and recommended increased support of its work.

The Public Speaking Committee proposes a National Public Speaking Contest. No definite plans have yet been prepared. It is proposed to hold elimination contests in member companies, States, Geographic Divisions, leading finally to a National Contest at the National Convention. The idea in general was approved and the Public Relations Section instructed to formulate more definite plans for resubmission.

An appropriation of $600 was recommended for the purpose of having six

16 mm. prints each made of the films, "Back of the Button," and "Yours to Command." Upon motion made and seconded, such appropriation was authorized.

Mr. Owens commented on the rapid development of sound-moving pictures and advised that portable talking equipment will be available shortly. He suggested that headquarters be equipped with a portable talking-movie projector as soon as one is available, this to be in charge of an operator and circulated throughout the country as an added service from the Association to Geographic Division, Sectional, and other important group meetings. The National Executive Committee strongly endorsed the idea as progressive, and approved its being carried out.

Accounting National Section

Chairman J. F. Ford advised that this section is well organized and fully functioning. Programs previously formulated have been consistently continued. In addition, special attention is being given to accounting for interconnection, merchandise accounting, budgeting, financial questions relating to mortgages, trust agreement, and latest questions in the field of investment trusts. The thirteen-month calendar is being studied. Special attention is being given to machine applications for all office accounting. The Statistical Committee has participated actively in the development of the Research Statistical Department at headquarters. Increased participation by the Geographic Divisions and fuller coordination between the Geographic Division committees and the National Committees has been marked during the year. Two group meetings of the entire section have been held, both in Chicago, on Oct. 29 and Feb. 25. Chairman Ford expressed appreciation of the cooperation of various members at headquarters in his work.

Commercial National Section

Chairman Marshall E. Sampsell reviewed the reorganization of the section this year into three major bureaus with related committees grouped under each bureau in order to harmonize more completely with Geographic Division structure. This plan is working extremely well and excellent cooperation has been attained between the Geographic Divisions and bureaus. Increased attention to commercial development is observed in all sections of the country.

The restricting factors in commercial progress are being analyzed and definite plans put into action for dealing with them. The section, through its Wiring Committee, is cooperating with the Codes and Standards Committee and the Engineering National Section on the National Electrical Code and the whole wiring situation. The Promotional Rates Committee is studying rates for domestic service and their relation to the development of the household appliance load. Quality standards of appliances as affecting costs and performance are under study.

The section has stimulated intensive training of commercial men working in specialized fields. Training school conferences, usually for one week, have been held, as follows:

Lighting Service, Harrison, N. J.—Feb. 11-16, 1929, and Commercial Cooking, Chicago—Sept. 17-19, 1928; and Industrial Heating Course will be given at Case School of Applied Science, Cleveland, May 13-24 of this year.

Public acceptance and market situation on a broad basis has been studied by the Industry Sales Conference. Mr. Sampsell stated that the original plan as submitted was being revised downward. It is expected the final sales plan will be announced before the National Convention.

Because of rapid development commercially of rural electrification, a Farm Appliance Sales Committee has been formed to coordinate with the Rural Electric Service Committee.

A domestic water heating survey covering the entire country is now being conducted with the assistance of the Engineering Section. Plans for a national educational movement in food preservation, involving all types of refrigeration, have been formulated and will be announced in Chicago, on March 22.

Engineering National Section

Chairman E. C. Stone reported the committees of the section all in active operation. Their slogan, "More System Capacity per Dollar of Investment," has been emphasized and definitely reflected in their work. Two new committees, namely, "Power Stations Engineering" and "Special Engineering Research," have been organized and are functioning. The Power Stations Engineering Committee has held two meetings; a third meeting will be held during the Engineering Section Meetings, Memphis, Tenn., March 11 to 14. The plan of operation of the Special Engineering Research Committee for coordination and stimulation of research within the industry, will also be discussed at Memphis.

The section recognizes the growing importance of its participation in the development of codes and standards affecting power system engineering. At the request of the National Fire Protection Association, a committee to develop a code for power stations and substations was organized. The committee was active during the winter and in record time submitted its recommendations to the N. F. P. A. meeting in New York during January.

A most competent group of technical advisers was enlisted to assist in the recent considerations of the National Electrical Code. This technical advisory group did splendid work in analyzing the problem of grounding interior wiring, and in formulating suitable engineering recommendations for presentation to the Electrical Committee of the N. F. P. A.

Chairman Stone advised that special subcommittees have been organized in the main body of the section and in the Geographic Divisions, to cooperate with the company code representatives, in working out problems connected with Codes and Standards.

Special and General Committees

Codes and Standards Committee. Chairman Irvin W. Day reported that this committee has been largely concerned with the National Electrical Code. In the matter of grounding, a tentatively satisfactory solution has been reached due to the objectionable provisions of the 1928 code having been eliminated by the adoption of the 1925 grounding rules for use in the 1929 code. It is expected that the 1929 code will be approved for circulation by June. The cooperation of the fire insurance and manufacturer representatives was acknowledged.

It is the view of this committee that the industry should take a more active part in codes and standards formulation. Definite steps to crystallize an organizational structure within the industry to this end are under way. An outstanding accomplishment has been the organization of a group of company code representatives. In response to a letter from President Arkwright, some eighty-five such representatives have been designated by company executives. This group will supply information from local areas needed for determination of code policies, observe operation of codes, and become points of referendum. The compilation of information on accidents and their causes has commenced.

A meeting of company code representatives will be held in Chicago on March 18 and 19, at which time the development of the National Electrical Code along with all other codes and standards projects of interest to the industry will be discussed, and working plans for continuity of work by the group established.

Insurance Committee. Chairman W. H. Sawyer reported a meeting of his committee at headquarters, Tuesday, March 5. The committee is concerned with broad industry relations with fire insurance companies, also with the technical aspects of fire insurance protection. Subcommittees have recently been named to deal with Insurance Statistics and Rates, Education, and Electrical Apparatus Clause. Recent meetings have included officials of leading fire insurance companies. The common fields of interest are better understood. The committee has cooperated closely with the Codes and Standards Committee on the National Electrical Code.

Rate Research Committee. Chairman L. R. Nash stated that an outline of committee work has been prepared. The committee continues its studies of basic rate structures and rate movements for diffusion of electric light and power member companies.

Rural Electric Service Committee. In behalf of Chairman Charles F. Stuart, Dr. E. A. White reported on the plans for the National Rural Project in Maryland. The respective State rural experimental investigations in progress for a number of years have yielded a wealth of valuable information but have necessarily confined themselves to developing the most obvious uses for electricity on the farm. None of them is equipped to go much beyond this point. The National Rural Project will carry this experimentation still further forward. Mr. George W. Kable, director of the National Project in Maryland, was introduced.

Civic Development Committee. Chairman John B. Reynolds reported that a major activity of this committee has been cooperation with the Policyholders' Service Bureau of the Metropolitan Life Insurance Company in a basic study of industrial development in the United States since the war. This will analyze migrations of industry, new industrial development, and interpret causes. Interviews and surveys covering the entire nation have been made by trained economists. The report will be presented March 29 at a special conference called by the Metropolitan Life Insurance Company.

The committee has made its services available to the General Federation of Women's Clubs which is stimulating a Better Homes Movement. This is directly in line with the aims of the Civic Development Committee, which is interested in all phases of community improvement.

Advertising Committee. Chairman Frank Leroy Blanchard reported that a meeting of this committee was held in January. Interchange arrangements for advertising copy have been made between many of those directing company advertising. Copy is also made available to headquarters for assistance in preparation of the weekly Advertising Copy Service regularly furnished member companies. Quality of utility advertising is steadily improving. The committee reports that the volume of advertising by electric light and power companies is small relative to other businesses. It strongly recommends larger use of advertising by the companies. A questionnaire to secure much needed facts on utility advertising will shortly be circulated.

Exhibition Committee. Chairman E. W. Goldschmidt reported that the exhibition this year will be in the New Municipal Auditorium. The space allocation is 20 per cent more than at any previous convention. The exhibitors are making most elaborate plans for showing the latest advances in their respective fields. The dedication exercises of the new auditorium will be held Friday, May 31, and the exhibition will be open to the public over the week end.

Educational Committee. Chairman Fred R. Jenkins reports steady increase in number of employees taking courses offered by the committee. The new course in advanced accounting has met excellent favor. The committee is studying industry needs for further courses.

Prize Awards Committee. Chairman W. H. Onken, Jr., stated that announcements of the prizes offered by the association had been sent out and that papers in competition were commencing to come in, indicating wide spread interest. The committee has under consideration other prize awards which have been tendered the association. Most of the prize awards now offered are provided from year to year. Consideration is being given to a plan to stabilize the awards through the creation of an award trust fund.

Association of Railway Electrical Engineers. Mr. E. W. Lloyd told of meeting with the Committee on Purchase of Electrical Energy of the Association of Railway Electrical Engineers. He pointed out the lack of standardization of railroad power contracts through the country, and suggested its consideration by the association. The subject was referred to the Rate Research Committee.

Approved — Insull Medal Applications. Applications for Insull Medals, approved and recommended by the Accident Prevention Committee, were approved as follows:

Walter Clarendon Shults, Public Service Co. of Oklahoma, Tulsa, Okla.

Andrew J. Huling, Portland Electric Power Co., Portland, Ore.

George A. Herman, General Electric Co., Erie, Pa.

Norbert A. Shubert, General Electric Co., Erie, Pa.

Edward Andrew Gale, The Connecticut Light & Power Co., Waterbury, Conn.

Ronald Reid, Vermont Hydro-Electric Corp., Rutland, Vt.

G. D. Hardy, Tide Water Power Co., Wilmington, N. C.

Blair Jenkins, Jr., Carolina Power & Light Co., Raleigh, N. C.

L. E. Danks, Mountain States Power Co., Albany, Ore.

Alfred Walsh, New York State Gas & Electric Co., Ithaca, N. Y.

Stanley Albert, Harlem Valley Electric Co., Sand Lake, N. Y.

C. R. Holland, Chester Valley Electric Co., Coatesville, Pa.

Hanson G. Cookson, Central Maine Power Co., Pittsfield, Me.

David Shelton, Gulf States Utilities Co., Beaumont, Tex.

R. W. Dickerhoff, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Victor William Galleth, The New York Edison Co., New York, N. Y.

Thomas Ashworth, Fall River Electric Light Co., Fall River, Mass.

Memorial for Presidents of the Association. Managing Director Clapp recommended that a suitably engrossed memorial be prepared by the association to be presented to each outgoing president in recognition of his services to the association and the industry.

Upon motion made and seconded, this recommendation was unanimously adopted.

Behind the Veil
The Tears of the Heliades

By Ernest Greenwood

(Number 1 of a series)

IN the interior court of what would seem today like a modest, one-story bungalow, built of sun dried brick and faced with stucco, reclined an old man with snow white hair and beard. He was called Thales and he was one of a group of Ionian wise men whose thought has come to be regarded as a forerunner of both philosophy and science. There was no philosophy before the time of these Greek sages, and they had little to build on—Greek philosophy and Greek science had everything to create.

THE year was approximately 600 B. C., and the old man was dreaming. Before him, on a small table, were a number of beautiful fluorescent stones of almost every color of the rainbow and named "Elektrons," or, as we know it, amber—not the yellow amber which is the slave of My Lady Nicotine, but the costly sun stones—"Tears of the Heliades." According to the Greek myth, the Heliades (some historians have called them the Elektride Maidens) were sisters of Phaethon, son of Jupiter, who, destroyed by his father because of an unauthorized adventure with the family sun chariot, was buried on the shore of the Eridanus. His sisters, accompanied by their mother, found his tomb and remained beside it, weeping bitterly. Jupiter, incensed at the part which they had played in the Celestial joy-ride, turned them into trees from whose branches their tears continued to fall. These tears, we are told by Ovid, were hardened by the heat of the sun and became Amber, "which the beaming river receives and sends to the Roman ladies for their adornment." Milton refers to this beautiful myth in the lines:

"Him the thunderer hurled
From the empyrean headlong to the gulf
Of the half-parched Eridanus, where weep
Even now the sister trees their amber tears
O'er Phaethon, untimely dead."

Mr. Greenwood is the author of "Aladdin, U. S. A.," a study of the electrical industry published in 1927 by Harper and Brothers, and the more recently published "Prometheus U. S. A.," a study of fuels and their relation to modern civilization. This is the first of a series of articles under the general title of "Behind the Veil" which will portray against a social-historic background, the evolution of the electrical industry and the chief personalities that have been instrumental in its growth

Opinions as to the origin of amber have always been contradictory and conflicting, but if we accept it as the first substance to give evidence of the phenomena of electricity, its genesis must be of historical interest. It is quite possible that one of the reasons for the veil of mystery surrounding it has been the fact that the Phoenicians were always inclined to give the Greeks mysterious accounts of their trading tracks, which they did by means of fables and pretended ignorance. Their story of the source of amber is typical. It reads:

"Passing behind Trinacria (Sicily) one comes to the mouth of the ocean which encircles the whole earth. One steers past Atlas on the left—the pillar of the vaulted sky—together with the gate of the Sun and the happy elysium, leaving to the right, on the Cimmerian strand, the portals of the nether world and the sources of the ocean in a silver rock sustaining the heavens; then, amidst incredible dangers, one follows the dark shore to the isles of tin, and to the stream Eridanus, in which the costly sun-stone, elektron, falls in drops from certain resinous trees, by reason of the glowing heat of Helios sailing back to Colchis." The isles of tin were presumably British Isles, and this would indicate they had proceeded up what is now known as the English Channel. On the other hand, the Eridanus is supposed to be the river Po in northern Italy.

AS a matter of fact, amber is the resin of an extinct *pinus* which flourished in the lower Tertiary period. It was "distilled by pines which were dead before the days of Adam" and, according to W. Arnold Buffum, is "widely distributed over the Northern portion of the earth." This resin has been fossilized as a result of long submersion in the ocean and from a tree gum has been transformed to a "gem."

Amber was the most important gem known to the ancient civilized world, and for ages was the principal factor in the intercourse of various and widely separated peoples. Often in the past, Sicilian amber sold at a price far beyond the price of diamonds. According to Buffum, "the peculiar, distinctive quality of Sicilian amber—that which distinguishes it from its fellow gems and gives it its indescribable charm and expression—is its fluorescence; 'that property which some transparent bodies have of producing at their surface, or within their substances, light different in color from the mass of the material, as when green crystals of fluorspar afford blue re-

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Author's Note: The author wishes to express to Dr. Charles Burton Gulick his deep appreciation of his book "Modern Traits in Old Greek Life" from which much of the material in this article was obtained. He also acknowledges his debt to E. Arnold Buffum, author of "Tears of the Heliades or Amber as a Gem," Georg Brandes, author of "Hellas," John Pentland Mahaffy, author of "What Have the Greeks Done for Modern Civilization?" Geoffrey Parsons, author of "The Stream of History," and Gustave Glotz, author of "Ancient Greece at Work."

flection. This curious property is due not to the difference in the color of a distinct surface layer, but to the power which the substance has of modifying the light incident upon it.' Thus, in my collection, specimens may be seen which show sapphire blue, pale rose, violet and ruby hues, and every graduation of color from the tenderest gray to the most brilliant green—the actual color of the pieces being straw-yellow and faint olive." Amber may range in color shades from faint blue to deepest azure, and from pale rose to the intense red of the pigeon blood ruby, and amber stones may be red, green, violet, orange, or blue. Their hues are lovely and have been spoken of as the "hues of the primeval world."

THE supposed occult powers and manifestations of electrical phenomena caused amber to occupy the minds of the wise men of ancient times, and particularly that group of Greek philosophers and scientists who are always in the background of all modern thought. Perhaps it was Thales, or perhaps it was some other one of the Greek philosophers, who first began to contemplate the meaning of this peculiar attraction which amber, when rubbed, seemed to have for other substances. It may very well be that this attribute of amber was not the first to be noted by mankind. It is quite possible that the lode-stone of the City of Magnesia which Aristotle tells us about when he says, "the stone has a soul since it moves iron" may have been the first substance to engage man's attention to some natural law which he could not understand. It may have been noted long before the time of either Aristotle or Thales. But in any event Thales may serve as well as any other as a symbol of those times when men first began to actually think and to wonder about the Universe. Naturally, electrical attraction would occupy their most serious attention.

Thales, whom the electrical industry credits with the first observation of electricity, lived on the threshold of what has sometimes been called the "Golden Age of Pericles," but what is better known as the "Classical Age." Today we still carry on much of the thought and customs of these early Greeks and are facing the same fundamental problems which engaged their best poetry and philosophy. Yet in those days both rich and poor lived in houses which the average American worker would sneer at as being only fit for animals.

The city house presented to the street a blank wall pierced only by a door and, perhaps, by one or two small windows, set high up. The streets themselves were so narrow that often a special tax was imposed upon the owner of a house having a door that opened outward. It is not difficult to speculate as to what would happen today if some legislative genius, intent on finding ways and means for providing income for government, would suggest a tax on houses having doors opening a special way or windows that swung in and out instead of sliding up and down.

If one entered the better houses he was greeted by a surly porter and passed through either a vestibule or directly into a court. The floor might have been the original earth beaten hard or strewn with pebbles or, perhaps it was paved with flagstones or mosaic. Mats and rugs were scattered about and, if it happened to be in the Periclean age, one saw rare and expensive rugs imported from the East. Behind columns which line this court were small rooms for the slaves; a sort of sun parlor in which much of the family life went on; and beyond, on one side a living room or "men's hall." The private rooms of the women were either on the further side of the court or on the second floor which is reached, not by a stairway such as we know, but by a ladder or steep stairs going up from some remote room.

THE furniture would seem to us to be almost primitive although much of its design survives in our furniture today. There were couches somewhat similar to a modern couch, or divan, or chaise longue. The chairs were of three types: stools without arm or backs used by both men and women at work; chairs with reclining backs; and the chair of state. Tables were used mostly at meals and were brought in and set before the guests. In the sleeping rooms were found couches of handsome wood, often inlaid with ivory, gold and silver and piled high with rugs. Later, mattresses came into use, stuffed with vegetable pods, wool or feathers and covered with embroidered spreads.

Water in the "Golden Age of Pericles" had to be brought in daily by slaves or by the daughters of the household from a spring or fountain. Like the primeval community fires these springs or fountains were the beginnings of the first public utilities.

We, who can have any amount of light at the touch of a button, can have but a faint idea of the difficulties which beset these ancients, who first began to speculate about the phenomena of electricity, when night time came. In the days of Homer servants brought in torches of pitch pine and these were often used in later periods. In the classical period they had earthenware or bronze lamps which were small, shallow vessels having one or more holes for wicks and filled with olive oil. "Burning the midnight oil" is an expression which can easily be traced back to this era. The thrifty householder was always complaining when a slave put too large a wick in the evening lamp.

HEATING facilities in these early Greek houses were of the most primitive type. Nothing in the way of central fires were known until Roman times when the wealthier citizens had the crude hypocaust—a fire in a brick vault in the cellar and tended by slaves. Some Greek houses had fire places but chimneys were unknown and the warmth obtained hardly compensated for the discomfort caused by smoke. Others were heated by open braziers containing small fires of charcoal. In most houses one had to go outdoors to get warm. Diogenes — the same Diogenes who was always walking around with a lantern looking for an honest man—had but one request to make of Alexander the Great, and that was to get out of his sunlight; whence came, perhaps, the phrase, "a place in the sun."

But, what these early Greek homes, of the days when electricity as a recognized force was struggling to be born, lacked in material comforts was more than counterbalanced by the beauty and variety of their vessels of earthenware, bronze and even precious metals. The inventive and artistic genius of potter, metal worker and vase painter found full expression in almost inconceivable variety. It must also be remembered that these early Greeks first embodied the enterprise and inventive genius of Europe and America; they were the first Westerners. They required comfortable chairs as contrasted with the Oriental who does not. The contrast between the elaborate furnishings of a modern American home and the meagre appointments of a Japanese house is directly due to the example of the Greeks.

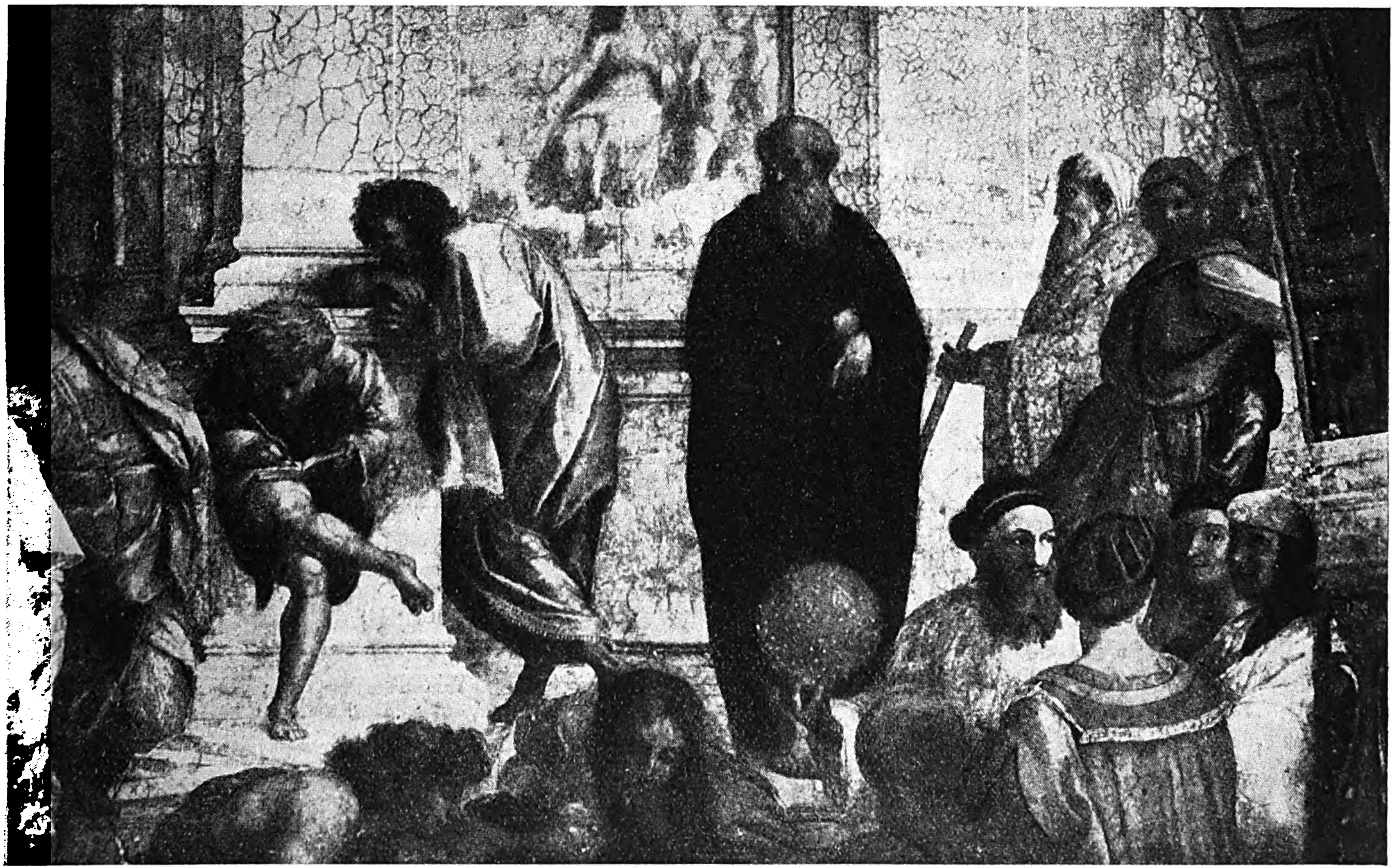
"If 'the apparel oft proclaims the man'," says Professor Charles Burton Gulick in his charming book *Modern Traits in Old Greek Life,* "the quantity and quality of his food are apt to mark his character quite as well." It was Socrates who first said "Bad men live to eat and drink, good men eat and drink to live," while Acoumenos, the Greek physician, proclaimed that "the fool that eats till he is sick must fast till he is well." The daily fare of the early Greeks was marked for its simplicity and frugality. The Persians, who according to Herodotus, were in the habit of roasting whole oxen, horses, camels, and asses in extravagant barbeques, regarded this Greek fare as poor and scant and the luxurious Romans had only contempt for the "hungry little Greeks."

While much of our present day civilization is directly traceable to the life and thought of the days just preceding Pericles, there were many customs which might very well have been continued even to today. For example, a private dinner was conducted with pleasurable simplicity. The guests were invited orally and any guest was quite at liberty to bring a friend with him. It was the height of bad manners to be late and there was no waiting for a guest who failed to appear at the appointed time. From these simple private dinners came the permanent dining clubs, conducted along lines which, no doubt, would be approved by the Rotary or Kiwanis Club of today. These associations were called "eranos" and the members contributed, each his share, to the cost of the meal. Various individuals were appointed to make all of the arrangements including the entertainment just as a modern luncheon club has its committees on arrangements, entertainment, etc.

IT was in the eranos that the first idea of a fraternal organization was born. If one of the members was so unfortunate as to be arrested and fined the members paid the fine. If a member was captured in war his ransom might be provided by his fellow members. It also often happened that these clubs departed from an exclusive social purpose and became mixed up in politics. They were sometimes accused of being "propagandists" although they no doubt insisted that their work was purely educational. Thus we see that our own great national controversy—what is educational and what is propaganda—is, after all, as old as civilization itself.

Another, and what may seem to some folks a rather quaint early Greek institution, was the sacredness of family life and a firm belief in monogamy. The binding character of family relationships extended even to remote cousins and no crime was so great as the shedding of a parent's or a brother's blood. Divorce was almost unknown and both in the theory and practice of statecraft the thought predominated that the community was an association of citizens all of whom were related and descended from a common ancestor.

Professional "emancipators of women" of today might do well to study Greek history. Apparently there was no necessity of going around shouting "equal rights for women." Equality was assumed; not asserted. Poetry and sculpture (especially the terra-cottas and grave reliefs) attest the affection felt for wives, mothers, sisters and nurses. Persons of breeding upon seeing a woman on the street did not ask "whose wife is she?" but rather



Detail from the painting by Raphael in the Vatican

THE SCHOOL OF ATHENS

Thales is the figure holding the staff in the group of three at the extreme right of the picture "whose mother is she?" Women of this period were noted for learning and wit as well as for beauty, and men of rank like Pericles and Socrates, treated them with the greatest respect.

On the other hand there were quite as many people in those days who felt that "woman's place is in the home" as there are in America today. Hector admonished Andromache that her proper work "is at the loom." Had Menander lived in this day and age he would have been extremely unpopular with women's political organizations for he it is who said: "woman's place is at the loom, not in the Assembly." Yet in the fifth century B. C. Euripides prophesied the "new time for the new women" and in the Hellenistic age women came to own and manage property, found institutions for education and religion, and build notable monuments to the dead.

WHILE most historians are inclined to disregard the science of these early Greeks it must be remembered, as Dr. Gulick tells us, "that the Renaissance itself was the rediscovery of Greek and Roman inspiration, and that without the vocabulary which the Greek and Latin bequeathed, modern terminologies would be helpless. Merely Teutonic or Celtic material could never have supplied terms so convenient as electron, ion, cathode, to say nothing of telegraph, telephone and radio." All of the professional sciences had their root in the speculations of these Ionian philosophers from Thales onward. It was Thales who predicted eclipses much to the astonishment of his contemporaries.

For example, the atomic theory is the basis of chemistry and physics today. Yet Democritus (fifth century B. C.) and Leucippus a hundred years earlier, assumed an infinite multitude of indivisible particles or atoms, and attributed to them motion, which brought them into contact with one another and produced the universe. That the earth was round was claimed by the oldest Pythagoreans who also conceived the idea that it and the rest of the planets revolved around a central "fire." This idea, however, was not accepted until the days of Copernicus (sixteenth century A. D.). Again we find that much of what we know today was being thought of in the days of Thales when he contemplated the fact that amber, the Tears of the Heliades, had the power to attract other objects when rubbed.

It is in the fifth century B.C. that we find the genesis of the so-called "ghost writer." Every party to a law suit had to conduct his own case, which, with due apologies to the legal profession, seems like a good idea. This gave rise to the profession of "speech writer" who, if our historians report correctly, was the fore-runner of the modern lawyer. The speech writer studied the case, prepared a speech for his client, who committed it to memory and recited it before the court. Demosthenes, who had to earn a living, was one of these ghost writers and once was accused of preparing speeches for both sides in a law suit. Any ghost writer today will be glad to admit that he can write material on either side of a controversy.

THERE were blackmailers in those days wearing an air of respectability just as we have blackmailers today. They would bring trumped up charges against rich men unless they were paid. They were known as informers and at one time, according to Dr. Gulick, threatened to defeat all justice in the courts. Their modus operandi bears no slight resemblance to the attacks which are being made continually on so called "big business" and which is so hard to combat because men engaged in large scale affairs have little time to worry about those who, lacking in any particular ability themselves, can find little to do but attempt to tear down.

And so, if we had the time and the space to consider all of the recorded history of the days of Thales, his contemporaries and the hundred years which followed, we might easily find that the things which we are doing today were being dreamed of 2600 years ago even though the Ionian philosophers, Pericles, or even Alexander the Great had no idea how these thoughts might be put to some practical use. Turning to medicine we find that these early Greeks called it an "art" rather than a "science" and the surgeons had instruments which strangely resemble surgical instruments of today. Some of their theories of education would put to shame the average American Public School. Archimedes laid the foundation of mechanics and engineering. Physical culture was quite as important (if not more important), as it is now. Solon instituted financial legislation in which one can detect the rudiments of the gold standard which still prevails. The "hot dog" vender peddled his meats on the streets (according to Aristophanes) and the poor little old woman hurried to market to sell her embroidery. The dry climate and poor soil resulted in considerable skill in irrigation which is duly referred to the U. S. Reclamation Service. Credit was extended but bills had to be paid by the end of the month. Marine insurance was a real business. Port duties, customs, commissions and rake-offs were as common as they are now. Transportation was as good as it ever has been until within the last hundred years. Historians and philosophers got little more in the way of recompense than they do today. One might say that, after all, there is little under the sun that is new.

PROPAGANDA

An expert on public relations
  Has hired all the slaves of the pen
And tells all the best publications
  Just what they should publish, and when.
If a joke makes you laugh 'till you think you will bust
It was likely inspired by the pants-button trust.

The fictional gems that inspire you
  In even the best magazines,
Are really intended to fire you
  With zeal to buy bathtubs or beans;
And the various poems entitled "To Spring"
  Might be propaganda for any old thing.

You may read, if you want to grow wiser,
  But be careful, whatever you do,
And let no sly proselytizer
  Put anything over on you.
And sigh, as you come to the end of a book;
"He's clever, at that, the press-agenting crook."

—STODDARD KING, in *Spokesman-Review*. Clipped from the *School Executives' Magazine*.

AND so, perhaps, we may return to our old man reclining in the interior court of his modest, one-story bungalow, contemplating his bits of Sicilian amber and occasionally rubbing them with a cloth. What is he thinking about? Is he dreaming of a force that may some day do the work of the world? Does he have an old man's vision of the great steam turbine, the water fall harnessed and doing the work of a million slaves, the electric motor lifting from the backs of man the drudgery and hopelessness of every-day toil, the transportation, communications, and everything else which electricity has contributed to our everyday lives and which seem commonplace to us? Perhaps Thales was thinking of these things—who knows?

James H. McGraw Prize Paper

STREET LIGHTING

A Much Neglected Source of Revenue

By W. T. BLACKWELL

FACING every electric service company is the problem of increasing both the load and the revenue. This has been accomplished in various ways—by appliance sales, by home economic activities, by lighting campaigns, by the functions of a power department, etc. But in the midst of all of this agitation about new business, the field of street lighting—one which has tremendous potential possibilities both from a load and a revenue point of view—has been almost entirely neglected. Street lighting has been considered in the light of a moral obligation to the community, an exchange for a franchise, a nuisance and unprofitable, while in reality it is very profitable business and business which shows gratifying increases as the result of the efforts placed upon it.

Definition

In speaking of street lighting, care should always be taken to define exactly what is meant. For the purposes of this paper the subject of street lighting is divided into two general classes, utilitarian and ornamental.

Utilitarian street lighting is defined as the standard equipment furnished by a utility for street lighting purposes and supplied with service from the pole lines.

Ornamental street lighting is defined as ornamental posts and tops supplied with service from underground.

Modern Standards of Street Lighting

Since the electric service companies which serve only one municipality are relatively few, the remarks in this paper may be considered applicable to the street lighting problem of any electric service company, but particularly so to the problem of the company supplying a number of cities and towns and having the usual relations with municipal, county and state governments.

Mr. Blackwell's paper won the James H. McGraw third prize, for 1927-1928. Mr. Blackwell is a member of the Street Lighting Committee of the National Electric Light Association, and of the Street Lighting Committee of the Illuminating Engineering Society. He has been active in the lighting industry for a period of 25 years and is at present General Lighting Representative of the Public Service Electric & Gas Company

There never has been available any evaluation of what comprises standard street lighting. The nearest approach to such an evaluation was made by the New York State Conference of Mayors and Other City Officials and the Empire State Gas and Electric Association in June, 1924, at which time certain standards of illumination were agreed upon. A marked step forward has been made in the principles of street lighting in the 1927 Report of the Illuminating Engineering Society Committee on Street Lighting which states:

"In reviewing the situation at its first meeting, March 27-28, 1925, the Committee reached the conclusion that it would be desirable, if practicable, to formulate a statement of such principles of street lighting as might find acceptance on the part of its members. While engaged upon this task the Committee undertook at its first meeting to list the elements which make for effectiveness in street lighting and to ascertain by assignment of numerical weights what differences of opinion are entertained by the committee members on these fundamentals.

"The differences proved to be so great that the formulation of a statement of principles of street lighting was deferred, not to be undertaken, as events proved, until two years later.

"During the present year, however, the committee has formulated certain statements of Principles of Street Lighting which it has adopted tentatively and which it offers for canstructive criticism. The committee expects to engage in a revision of these statements in the future and invites all who may be interested to contribute their views for consideration in connection therewith.

"The statement is presented in the following chapter of the report.

"The Major Purposes of Street Lighting are:

"1. To promote safety and convenience in the streets at night through adequate visibility.

"2. To enhance the community value of the street.

"Street lighting thus serves utilitarian purposes, and like other utilities, it serves its purpose best if it is artistically satisfying. Best visibility is usually computable with most pleasing appearance. A street lighting system cannot be artistic unless it provides good visibility.

'The beautiful rests on the foundation of the necessary.'—*Emerson.*

"Thus arises the further purpose:

"3. To accomplish the illumination of streets with the greatest practicable promotion of the æsthetic qualities of the street and of the street lighting equipment."

Classification of Streets

The report also undertakes the classification of streets into:

Primary business streets.
Secondary business streets.
Heavy traffic thoroughfares.
Medium traffic thoroughfares.
Light traffic thoroughfares.
Residence streets.
Alleys.
Highways.

and also makes recommendations for the intensity which is desirable.

Intensities

"For thoroughfares, average horizontal illumination of at least 0.2 foot-candles, attainable with available illuminants in good practice, at an expenditure of about

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EDITOR'S NOTE: Space limitations prevent the publication of supporting charts and other material which accompanied Mr. Blackwell's paper on "Street Lighting." If this material is desired it will be loaned upon request to the Editor.

> 40 lumens per linear foot* is to be considered a minimum. For streets exceeding 80 feet in width more light is required; under dense traffic conditions much higher illumination is desirable.
>
> "For residence streets average horizontal illumination of at least 0.05 foot-candle should be provided, with higher values recommended. In good practice this minimum can be obtained with an expenditure of about 10 lumens per linear foot."

The committee also adopted the following resolution with regard to sizes of street lamps.

> "RESOLVED: That there are no conditions of street lighting prevailing in the United States which justify the use of smaller than 1000 lumen lamps and that the 2500 lumen lamp is the smallest size which can be used with good economy."

From the standpoint of civic improvement, the first consideration is to build up the intensity of illumination on all of the streets rather than following the practice of many municipalities of spending the major portion of the appropriation to build up the intensity on a few blocks of one main street where a comparatively few tax-payers receive the whole benefit of the improvement.

Such a program would be infinitely more acceptable to the electric service company as the company would not be involved in the expense of underground service.

Civic Aspects of Problem

When first settled, the majority of the cities and towns in the country gave very little if any attention to the question of city development or future growth. When the developments did come along and growth was necessary, the municipalities, instead of expanding along some preconceived, well-laid plan, simply spread in the most convenient direction and there are many that just grew up. Most remarkable strides in growth have occurred with very recent times. In taking care of the increase in population, municipal officials have simply made arrangements for the first essentials in comfort—sewers, paved streets, sidewalks, etc.—but have paid relatively little attention to the street lighting.

Now that most municipalities have developed a civic conciousness, there is a stimulus for adequate street lighting. The movement is not a fad, for the question is one of paramount importance in the modern world. It is the result of a long neglected need. The average municipality has spent just enough in street lighting to make the darkness outside the lighted area more confusing. Towns and cities everywhere are realizing both the tangible and intangible benefits to be derived.

Good street lighting is one of the surest indications of municipal efficiency and it can be acquired and maintained at a moderate expense. The interest on the investment made in good street lighting systems is returned annually in the form of stablized or increased property values and a decrease in street accidents. Good street lighting creates a favorable impression of the thriftiness and progressiveness of the administration and of the tax payers, it advances civic pride, improves the sanitary conditions of the streets, is an excellent advertisement and aids in the promotion of other improvements.

Persons passing through a municipality in automobiles receive a favorable or unfavorable impression of the town from the condition of the street lighting. Good street lighting attracts industries and buyers. Furthermore, it facilitates the movement of traffic, assists the fire and police departments and discourages street crimes.

Former Police Commissioner Bingham of the city of New York is credited with the statement that one street lamp is as good as ten policemen.

Street Crime Study in Cleveland

A study made in Cleveland before and after installing good street lighting revealed some interesting data.

A. *All Street Crimes Committed at Night*

Months and Years	*Outside of Better Lighted District*	*Inside of Better Lighted District*
Oct., Nov., Dec., 1915, before improvements	350	73
Oct., Nov., Dec., 1916, after improvements	539	67
Increase, per cent	54	Decrease 8

B. *Major Street Crimes Committed at Night* (Burglary, Hold-up, Automobile Stealing)

Months and Years	*Outside of Better Lighted District*	*Inside of Better Lighted District*
Oct., Nov., Dec., 1915, before improvements	222	32
Oct., Nov., Dec., 1916, after improvements	434	37
Increase, per cent	95	15

While the number of street crimes committed at night was increased by 54 per cent in a year outside of the improved district, in the district where the new lighting was available the street crimes were 8 per cent less. It was further shown that taking only the major street crimes of burglary, hold-up and automobile stealing, the increase in a year outside the improved district was 95 per cent while on the better lighted streets it was only 15 per cent.

The time covered by this study was the beginning of the so-called "crime wave." In 1915, the year before the better lighting was available, the study shows seventeen out of every hundred crimes committed on the streets of Cleveland took place in a small district in the downtown business section which embraced less than 1 per cent of the street mileage of the city. In 1916 crimes in the business section were but little more than one-half, to be exact, 59 per cent, of what might well have been expected had no improvements been made in the lighting. Crime diminished as light increased.

Traffic Accidents

Another very important aspect is the reduction in traffic accidents. Messrs. Anderson and Hass, in an analysis of traffic accidents, have been able to show that at least 17.6 per cent of city night traffic accidents is due to inadequate street illumination. This figure is checked closely by A. W. Devine of the Department of Public Works, Massachusetts, who places the percentage of night accidents due to insufficient illumination at 13.5.

A canvass made by the Illuminating Engineering Society Committee on Street Lighting during 1927, among several organizations engaged in or having relations toward the promotion of safety failed to disclose any statistics which might be employed in determining the relationship of improved street lighting to safety in the use of streets at night. Among the institutions consulted were:

New York Safety Conference, Albany, N. Y.
National Safety Council, Chicago, Ill.
National Automobile Chamber of Commerce, New York.

Studies of statistics to develop information of this sort are always complicated by the presence of other factors of varying intensity and importance, including traffic and population density, type of population, nature of streets, automobile headlighting practice, etc. Whether or not any definite relationship can be established remains to be seen.

Early in its deliberations this committee recognized that bright automobile headlights are detrimental to good vision in the streets. While the committee did not reach an agreement

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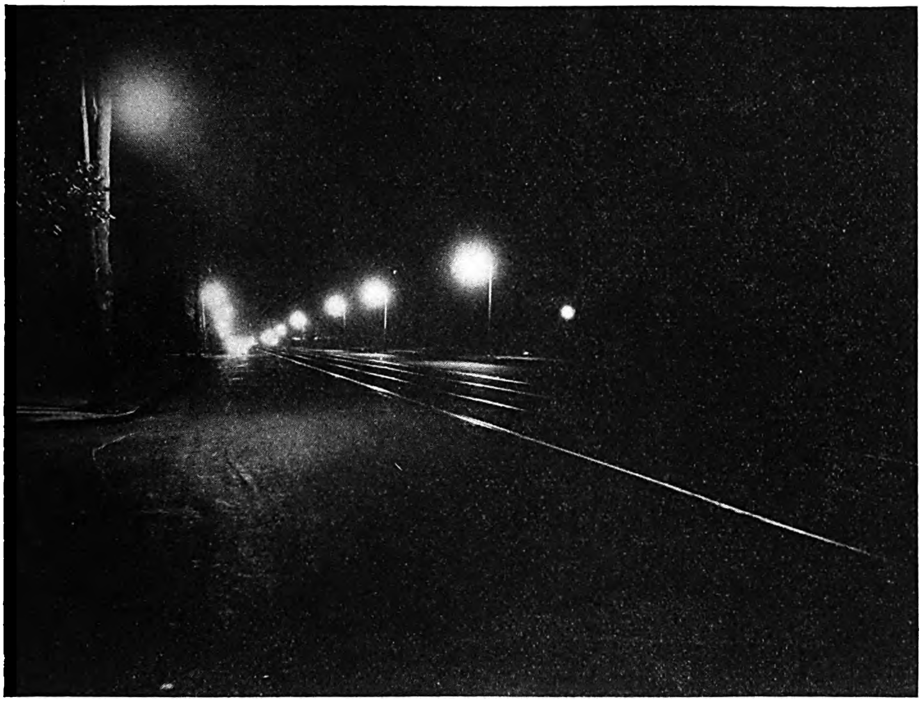
*The term "lumens per linear foot" and like expressions are measures of light output for street lighting. Such a term is analogous to "watts per square foot" employed in interior lighting. It does not take into account the proportion of light which reaches the street and is but a rough and incomplete index of the grade of illumination.

Where lumens or watts per linear foot are shown without specification, a street of not more than 80 feet between property lines is contemplated.



Elizabeth Street, Newark, N. J.

that headlights ought to be abolished in well lighted streets, the members did agree that conditions are better in such streets when automobile headlights are not used.

Recent statistics show that there is one automobile for every five inhabitants in the United States. This, together with the increase in power transportation, which includes buses, street cars, motor trucks, etc., makes it imperative that good lighting of the streets and highways be provided in order to facilitate the movement of this ever increasing traffic. Vehicular traffic cannot be moved expeditiously with safety to the pedestrian where proper street lighting does not exist.

Central Station Aspect

Of all of the services rendered by the central station to the public, street lighting is probably of greatest importance since it is the obvious or outward and visible symbol of the company's service to the public. Street lighting is of public benefit and affects all of the inhabitants in a community as well as the people passing through after dark. Where there is no street lighting or where the system is inadequate, a hazardous condition exists. The lack of interior electric lighting is annoying, but not necessarily hazardous.

Street lighting business is a profitable source of revenue. The average rate for a 100-candlepower lamp is greater than the annual bill for electric energy of the average residence customer. Compared with residence customer business, street lighting requires a minimum of investment. There are no meters or service connections, nor is it necessary to index meters or replace burned-out fuses. There is no credit risk and a minimum of accounting expense.

Recommended Methods for Developing Street Lighting Business

The street lighting load is of value to the electric service company as the greater part of it falls off-peak and because of its high load factor.

In developing street lighting business a thorough knowledge of all of the elements of the problem is very essential. This includes an analysis of the territory with the present conditions, a knowledge of the requirements and an estimate of the potential possibilities to serve as a guide for progress.

In analyzing the territory the following items should be considered for each municipality: population area in square miles, total miles of streets, miles of streets for each classification, tax rate, street lighting expenditure per capita, percentage of the tax dollar expended for street lighting and name of the official in charge of street lighting. This information should be tabulated for comparative purposes. Tabulations should also be prepared showing the number and sizes in lumens (or candlepower) of street lamps in service for each municipality.

The estimate of the potential revenue which may be received from each municipality is helpful as it permits a determination of the present saturation in street lighting for each municipality as well as for the entire territory.

Surveys should be made both for individual streets and for the entire municipality. Where possible, the improvement of individual streets should be made part of a comprehensive plan of improvement covering the entire municipality and spread over a period of, for example, five years. This insures an excellent street lighting system ultimately, makes certain that each in-

Somerset Street, Plainfield, N. J.

dividual improvement is correct with reference to the finished whole and spreads the cost of such improvements so that it shall not be too great in any one year. Spot maps should be prepared showing existing overhead and underground zones, existing pole lines, existing lamps and sizes of same indicated by one set of symbols and proposed lamps indicated by a second set of symbols.

With such a method both the municipality and the electric service company will derive benefit, since the lamps will be installed in the correct locations the first time, which means a saving on both sides as it eliminates the necessity of doing the work over.

Most municipalities are grateful for such assistance, as they do not have street lighting engineers in their employ, and where street lighting engineers are employed these plans can be carried out in cooperation with them.

Tests of present and improved street lighting conditions give helpful data.

Definite plans should be presented to the municipality early enough in the year so that it will be possible to have provision made for the improvements in the annual budget for the following year where funds are not available for immediate changes.

Substitution of Larger Lamps for Smaller

Another method which is successful is the substitution of larger for smaller candlepower lamps. The substitution of 100 cp. for 60 cp. or smaller involves no change in equipment, and usually the substitution of lamps larger than 400 cp. requires no change in equipment. The expense involved in such substitutions is found in the increased cost of the larger lamp and in the greater amount of energy which it consumes, both of which factors are provided for in the established rate for the larger lamp.

Analysis of Costs

Most electric service companies have been selling street lights and not street lighting. Street lighting involves not only correct sizes of lamps, but proper spacing and mounting heights as well. The municipalities are endeavoring to buy street lighting, but due to their unfamiliarity with the subject they are prone to base their opinion as to the efficacy of a system largely on the total number of lamps rather than on the amount of light emitted by each lamp and the spacing between lamps. To illustrate the point: the rate of the Public Service Company for a 60-cp. lamp is $26.50, for a 100-cp. lamp, $32.75, and for a 250-cp. lamp, $58.00, where less than 50 lamps are in use in one municipality. Since the 60-cp. lamps only deliver 600 lumens, it is possible to obtain approximately a 40 per cent increase in light with only a 25 per cent increase in cost by changto a 100-cp. lamp. A similar increase in light can be obtained by using the 250-cp. lamp which gives 2500 lumens at a cost of slightly more than twice the cost of a 60-cp. lamp, but with more than a 400 per cent increase in light. Where the reasons for correct mounting height, proper spacing and the use of larger lamps are pointed out to municipal officials, they are quick to appreciate them and to take advantage of the benefits.

Methods of Financing Street Lighting

In the majority of the municipalities the street lighting costs are met with funds raised by general taxation, but increased costs are sometimes met in other ways. The following historical note indicates one method which was employed in Boston in 1772:

> "In Boston it was somewhere about 1690 to 1700 that the town placed iron fire baskets on the corners of its most frequented streets to be kept filled and burning by the night watchmen going their rounds.
>
> "It was not until many years later, in 1772, that a meeting of the citizens was held to discuss means for more adequately lighting the streets after nightfall. A committee was appointed of which John Hancock was a member and after considerable discussion it was decided to send to England for several hundred lanterns suitable for street lighting purposes, as the record runs, 'lamps suitable for properly lighting ye streets and lanes of ye town.'
>
> "These lanterns were not paid for from the town's treasury, but a public subscription was taken to defray the expense. Unfortunately, the ship which was bringing them over from England was wrecked off Cape Cod, for, in a letter from a Boston man at that time, he says, 'It is unlucky that Loring had ye lamps on board for our streets. I am sorry if they are lost as we shall be deprived of their benefit this winter in consequence of it.'
>
> "However, some, if not all, of the lanterns seem to have been salvaged; for in the diary of one Thomas Newell under date of January 8th, 1774, is the record, 'Began to make tops (sides?) for ye lamps for ye town.' A little later he must have completed his work, for the record shows that on the evening of March 2, 1774, a number of the lanterns were hung and lighted for the first time and a large concourse of the town's people turned out to see the improvement. So satisfactory were they evidently that a little later two citizens were appointed from each ward to decide upon fitting locations for the remainder of the lamps."

These gentlemen must have been among the first illuminating engineers in this country.

In some states legislation has been enacted which enables the municipalities to improve the lighting on certain streets and assess the cost of the improvement against the benefiting property, or to issue bonds to cover the cost.

With an idea of ascertaining what the conditions are in various states, a questionnaire was issued, with the result that the answers indicated that the greater percentage of the state governments allow the cities to install street lighting—assessing the cost on a front foot basis against the owners of abutting property.

By working with municipal authorities, increases in annual street lighting appropriations can be obtained as the accompanying photostat clippings testify.*

The New York State Conference of Mayors and Other City Officials and the Empire State Gas and Electric Association went on record as follows:

> "The committee also recommends that after the adoption of such program, if additional lighting is desired by property owners on any street, such additional lighting should conform with the type and standard established and be approved by the proper municipal authority. Any cost in excess of the cost of the lighting specified in the program of such street should be assessed by the municipality against the abutting property owners. This assessment should be made on a curb foot basis and not on property valuation."

The street lighting policy of the electric service company should be as broad as is practicable. The company should be willing to proceed on a fair basis with street lighting improvements in each municipality and should have a reasonable program of conversion of overhead to underground service. Where a municipality wishes to proceed with the changeover from overhead to underground more rapidly than is provided for in the company program, the difference in cost should be adjusted by argeement between the company and the municipality, but the company should be willing to allow toward the cost of the underground construction that amount which would normally have been used for the overhead installation. In some states the Utility Commission requires the company to bear the cost of changing the service connections from overhead to underground. The ownership of the poles is a matter of local policy.

Contracts should be fairly worded and rates should be determined on a

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*Not printed here for lack of space. They may be borrowed upon request to the editor.

SKIND
CLOTHIER 237

Day View—Springfield Avenue, Newark, N. J.

basis which is just to the municipality for the service which it receives and which yields the electric service company a reasonable return on its investment in equipment, energy, etc. The step rate is to be recommended and small discounts for long term contracts, as this offers an inducement to the municipality to purchase in greater quantities.

The street lighting circuit is the pioneer circuit into new sections of a municipality. The commercial business follows. Where municipalities are sold the idea of lighting all of the streets, whether the sections are built up or not, new residence customers can obtain service which they normally would not receive for some time, particularly in these communities where the deposit system on long extensions is in effect.

The lighting of state and county roads and the lighting of parks and bridges presents a different problem. The pole lines erected for such purposes can not be used to obtain or supply other business. Under these conditions it is reasonable that a charge should be made by the electric service company for the pole line extension.

Most state highways are not lighted. The responsibility for this condition has been shifted from the state to the municipality and back again. In the meantime nothing has been done.

The investment entailed in extending service lines to rural communities is so great as almost to stop any general expansion of this order. An electric service company in its function to serve the public, cannot do so at a loss. Heretofore, rural service, except in a few limited sections, has entailed a very considerable loss which required years to make up. Good highway lighting can be installed for about 2 per cent of the investment in highways. This seems a very small amount to spend in order to make the highways safer and more useful. For speedy and safe transportation the highways must be well built and maintained in good condition. This is a recognized fact and large sums are spent annually by municipal, county and state authorities to maintain the highways of the country. Auto trucking requires the use of highways at night even more than in the daytime. Driving for pleasure at night is quite general, and there is always a certain amount of night business driving. With suitable highways the road traffic at night is cumulative. One authority places night traffic at about 20 per cent of the total. If this percentage were increased by illuminating the highways, an economic gain in their efficiency would be achieved. The lighting of the highways furnishes in part the solution to the problem of making rural service profitable.

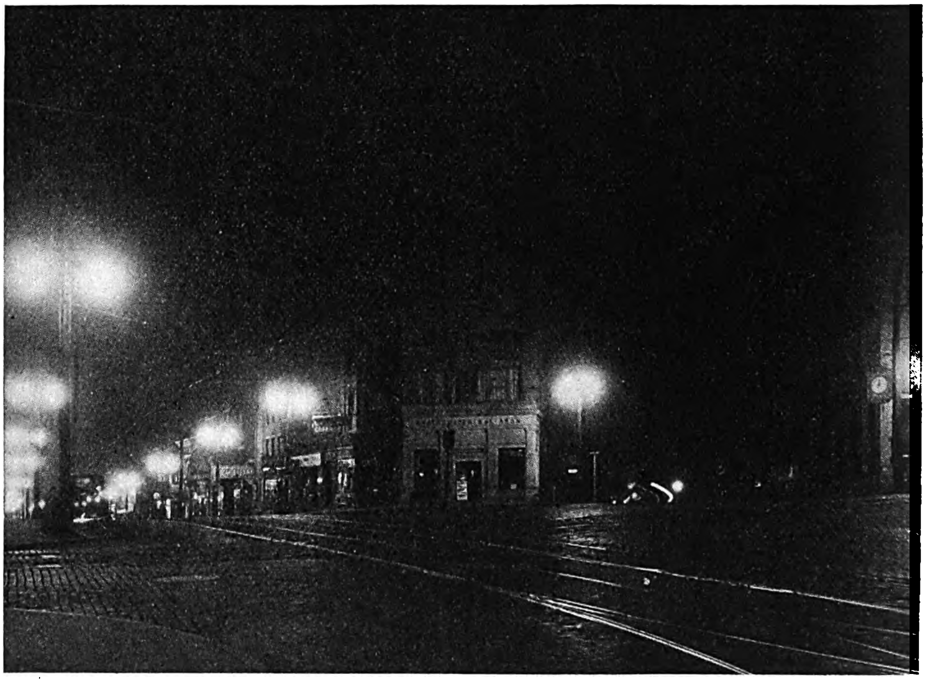
Practical Application

The ideas set forth in this paper are not entirely theoretical. They have been used more or less in their entirety during the last five years in the territory of the Public Service Electric and Gas Company in the State of New Jersey.

This company serves 216 municipalities with electric service and has divided its territory into six divisions: Essex, Hudson, Passaic, Bergen, Central and Southern.

Analysis of Lamps in Service

In order to arrive at a basis for the development of plans for increasing the revenue from street lighting, an analysis was made of the number and sizes of street lamps in service in the



Night View—Springfield Avenue, Newark, N. J.

six divisions and the results plotted on graphic charts. Another chart is plotted from month to month and shows the variation in street lighting revenue from January 1, 1920, to date.

The Lighting Department of the Public Service Company was organized in September, 1922, and began its work shortly thereafter. A study of the annual street lighting revenue figures indicates the result of their effort. While a certain percentage of each year's increase is attributable to normal growth, it may be noted that the slope of the curve prior to the organization of the Lighting Department is very much less than that from 1923 to date.

Statistics were obtained for each municipality showing population, total expenditure for street lighting and tax rate. This showed the expenditure per capita and the percentage of the tax dollar expended for street lighting in each municipality.

Letters to Municipalities

Since but few of the municipalities served have in their employ engineers familiar with street lighting, letters were prepared and sent to the municipal authorities offering the assistance of the illuminating engineers attached to the various districts in making surveys of street lighting requirements for specific streets or in making street lighting plans covering the requirements of the entire town or city for the next five years. The progress made in this work has been most encouraging, and it has been instrumental in securing substantial increases in the municipal budgets for improved street lighting.

In the Bergen Division such a letter was prepared and sent to 70 municipalities. Total of seven replies were received. Among the surveys made resulting from the letters was one which resulted in an increased appropriation for municipal street lighting from $4,000 to $11,000 in a town of 5669 population.

The efforts to have the smaller sizes of lamps replaced with larger lamps have been successful in many cases.

Underground Installation Program

Cities throughout the United States during the past three years have been giving considerable attention to the installation of high intensity ornamental street lighting supplied from underground service. These installations, in addition to the advertising and work of the manufacturers of such equipment, have caused a quickening of interest in this type of lighting in a number of municipalities. Where such requests have been coincident with the company's plans for the installation of underground, the installations have been made, but in other cases it has not been possible to do so due to the absence of underground service, except where the municipalities were willing to pay for the expense of the installation or where business men's organizations, etc., combined to defray such expenses.

Street Lighting Lectures

Talks on the subject of street lighting are given constantly before business organizations, chambers of commerce, etc.

Tests of street lighting conditions and intensity records both before and after improvements are made and placed among the comparative data.

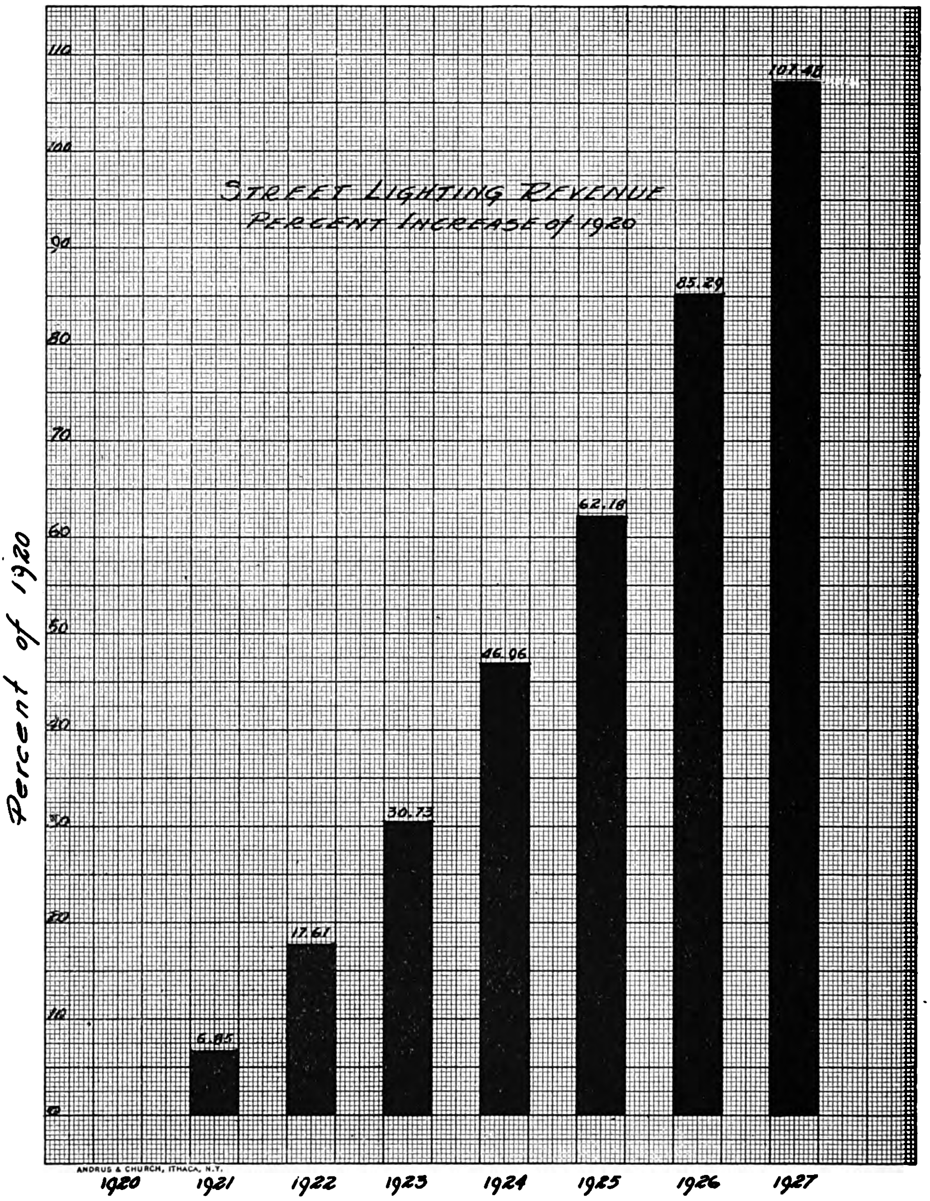
Edison Lighting Institute

The street lighting rooms of the Edison Lighting Institute, Edison Lamp Works of the General Electric Company, Harrison, N. J., are used as exhibits for civic groups and municipal officials.

Increases in Street Lighting Revenue

The increase in street lighting revenue for 1927 over 1926 amounted to $343,795.37, or 11.94 per cent. The comparative revenues from street lighting from January 1, 1920, to date are shown on the accompanying chart. It should be borne in mind that aside from natural growth these increases represent replacements and utilitarian

(*Continued on page* 235)



Percent Increase in Street Lighting Revenue—Public Service Electric and Gas Company of New Jersey

Amplifier Considers Rate Reductions

By AMPLIFIER

BROWSING through a pile of pamphlets the other day I came across the annual report of a great public service system which serves more than 3500 communities located in nearly thirty states and having a combined population of six million people. This system has more than a million and a half customers and a gross income in excess of 150 million dollars. During the past year it spent more than 62 million dollars for new construction.

Had this report contained nothing but statements of earnings and expenses, new properties acquired, corporate rearrangements, dividend actions, financial operations, surplus and reserve accounts, auditor's certificate, a polite letter of transmittal from the president and all of the other deadly data which go to make up the average annual report of the affairs of a corporation it would have had about as much interest for me as a last year's bird's nest. Anyone interested in this sort of literature can easily accumulate a library of scores of thousands. Frankly I am not.

But it just happened that, opening the report at random, I came across a chart, the caption reading: "This chart shows how a proper rate schedule encourages increased use of electric service, with the result that total revenue per customer is increased despite the smaller revenue per kilowatt-hour. In this subsidiary of .... the average cost of residence service has declined from 9.6 cents to 8.3 cents per kilowatt-hour. The average annual consumption by residence customers has increased from 254 kilowatt-hours to 350 kilowatt-hours. The company's revenue per residence customer increased from $24.60 to $29.10." According to the chart all of this had happened between 1922 and 1928.

This was interesting enough to merit further consideration. Turning to the figures for the whole system I found that the cost of electric service, both to domestic and industrial customers, has been steadily declining for years while the average consumption has been steadily increasing. Apparently here is one great concern which has proved the truth of a very simple fundamental principal—lowering costs means increased average sales and while the net profit per unit may be less the increased volume means increased gross returns and eventually increased net returns. This system, while steadily reducing the cost of its service to the consuming public has been spending tens of millions of dollars a year on extensions and improvements. Furthermore its securities are as stable as any on the market today.

"If this is true of this one outfit what is the situation for the whole country?" I asked the Statistical Research Department of the National Electric Light Association. And this is what I was told:

In 1926 the average residence consumer was using 404 kilowatt-hours a year. The average rate was 7 cents and the average household bill was $28.30 for the year. In 1927 the average rate was 6.8 cents, average consumption had increased to 429 kilowatt-hours a year and the average household bill had increased to $29.20 annually. The preliminary figures for 1928 show a still further reduction in the average price to 6.6 cents per kilowatt-hour, an increase in average consumption to 456 kilowatt-hours and an increase in the average household bill to $29.90.

NOW a decrease of 4/10 per cent per kilowatt-hour in the average cost during a period of two years may not seem like a very large amount. But suppose we multiply the average consumption by 19 million (the approximate number of residence customer) and then multiply that total by 4/10 of a cent. The result is $34,656,000. In other words if the 1926 rates had been maintained the domestic electricity consumed in 1928 would have cost the home owners of the United States thirty-four million, five hundred thousand dollars more than it did.

An increase of $1.60 in the annual bill for electricity of the average householder does not seem like a very large amount but suppose we multiply it by 19,000,000 residential customers. The total is $30,400,000. In other words, the people of the United States increased their consumption of domestic electricity to such an extent that they actually spent 30 million dollars more for electricity than they would have spent at the 1926 rate of consumption and average cost.

It has been said that the average householder will spend just so much for electric service each year and no more. But is this true? These figures seem to prove that for some reason or other he does increase his consumption as the price drops until his average bill is increased and the light and power companies are enjoying a steadily increasing gross income with a lower unit of cost which is due to just one thing—increased volume of sales.

THE principal reason is, of course, the increased use of household appliances. I dare say that if a survey were carefully made it would be found that, wherever there is a low domestic power rate, in that territory will be found the greatest market for these labor saving devices. The housewife has found that electricity is cheaper than dirt and she buys a vacuum cleaner. She has found that the electric washing machine and iron has reduced the cost of the weekly wash and greatly simplified laundry work. She finds the cost of current for the electric refrigerator is less than the cost of ice and that there is a still further saving in the elimination of waste of food which keeps far better than in the old fashioned ice box. She finds that the electric sewing machine makes sewing a pleasure while the many dining room appliances enable her to be a hostess instead of a maid when entertaining. The householder finds that the automatic oil burner operated with an electric motor saves him untold drudgery and much incidental expense in connection with the operation of a coal burning furnace.

Once our householder and his wife have installed these things, often because of the decreased cost of current, they will never go back to old methods. Their bills for electricity may be a little higher—it has been shown that the average increase has only been $1.60 a year in two years—but they give no consideration to this fact because they know that the savings in other directions plus the increased comforts and convenience more than compensate for the increase.

Of course, it is quite possible to understand that in those territories where the rates have been maintained or even increased, where there is no power rate for residences and household appliances have to be operated on a light meter with a lighting rate, there must be some cause for complaint. There must be more or less "sales resistance" when the agent for a washing machine or an electric refrigerator calls around. There is the experience of this or that neighbor who has installed some of these things on a lighting rate and they cry aloud to heaven about bills which may even have doubled. The "prospect" for appliances, and therefore for more current, holds back—he is fearful of bills far beyond the capacity of his budget in spite of the increased comfort and convenience.

All of which again suggests that lowering rates will increase consumption and, while the householder's total bill may increase, he will feel that he is getting more for his electrical dollar than ever before, which, after all is a mighty important thing in connection with public relations. I do not believe it is the total bill which the consumer thinks about so much as what he is getting for his dollar.

DESIRING to make one further check on this theory I spoke about it to a friend of mine who lives in a city where one of the largest electrical manufacturing plants in the world has its home. I found that the local light and power company has had exactly the same experience. It has been steadily reducing its rates and with each rate reduction the sale of appliances has been stimulated, the average consumption and the average residence bill has increased. The company is enjoying a constantly increasing revenue and the consumers are being benefited by constant rate reductions.

Or, suppose we take one more example. B. C. Forbes in a syndicated article appearing in at least one of the Hearst newspapers tells a story of rate reductions which is interesting. He starts out with the question: "Is it possible for an executive to take hold of a corporation that is hated by its community and transform it into the most popular of all local enterprises—yet raise it from weakness to strength, from poverty to profit simultaneously with reductions in the prices charged for its product?" He is speaking of a light and power company and at the end of the article answers his own question in this fashion: "Consumption of Electricity, thanks to the lowered rates and attractive service, has doubled in less than nine years. Every large business establishment now prefers to use the company's power, and farm electrification is being pushed." The same old answer.

SURGES AND FLASH-OVERS

By Fred W. Herbert
Director, Service Department NELA

The professional man has a diploma and rides a hobby. The skilled workman has a trade and rides in a Packard.

* * * *

Some people keep their minds on their work and others keep their work on their minds.

* * * *

Music hath charms to soothe the savage beast. That accounts for the brass band around a dog's neck.

* * * *

From the plays made by some golfers they ought to build the golf courses with all fairways on the side, the rough in the middle and greens in the traps.

* * * *

When the telephone operator asks you to hold the line, does she think you are fishing or is she fishing, and who is the sucker on the line.

* * * *

1909 News Item—A lady caught her toe in the hem of her skirt, fell and dislocated her shoulder.

1929 News Item—Men now fall for the hem up to the knee.

* * * *

Speculating on Wall St. is like the elevator. When it's going up, I am just too late to get on, but am always there when it's going down.

* * * *

To grow big in a job is one thing; to swell up in it is another.

We heard a man boast that he came up from a barefoot boy. The biggest men the world ever knew were born barefooted.

* * * *

Authentic News—The menu card on a Pennsylvania diner says that "the Pennsylvania Railroad Organization employs 175.000 men. 'Each is a railroad man.'"

* * * *

In business as in football, if you must kick, be sure and kick toward a goal.

* * * *

What is college bred?—Possibly a combination of the flower of youth and the dough of old age.

* * * *

Girls who use dumb bells get good color, others use lots of color and get dumb bells.

* * * *

Laughter is healthful. If there are days you can't find anything to laugh about, laugh at yourself because if you only knew, you are always funny.

* * * *

Some people are absolutely punctual because they are always late.

* * * *

Thomas Hood in his famous poem written in 1843, "The Song of the Shirt," had a vision of the modern electric washing machine.

"O men with sisters dear!
O men with mothers and wives!
It is not linen you are wearing out,
But human creatures alive."

BUT after all there is nothing unique about the situation. There is no reason why what is true in other industries should not be true in the light and power industry. Suppose the cost of automobiles should remain stationary or be constantly rising instead of being either steadily reduced or what amounts to the same thing—more automobile value being given for the same money. How long would it take the automotive industry to reach to so-called "saturation point?" Or, in this same connection, suppose the price of gasoline should rise until it compared with the cost of gasoline in Europe. How many big motor cars would be sold and how fast would the demand for gasoline drop?

The theory of the chain store is based on the same principle. Anything, any arrangement, to lower the ultimate cost to the consumer, increase sales and eventually do a bigger gross business at lower unit costs to the buyer.

How has the electric industry gone about creating a situation whereby it could bring about a steady reduction in rates? The first thing of which I can think is by the expenditure of great sums in improvements in the art of generation and distribution. Of course this is another story on which one might write several books. The fact remains that most of the companies, and particularly most of the big companies, seem to have been far sighted enough to recognize this simple principle in merchandizing and to have had sufficient imagination and courage to do those things which have been necessary to bring such a situation about. No doubt it has taken the highest courage and the sort of vision that recognizes the true meaning of "public service." At least so it seems to me.

Lineman? LINEMAN!

By J. R. Patterson

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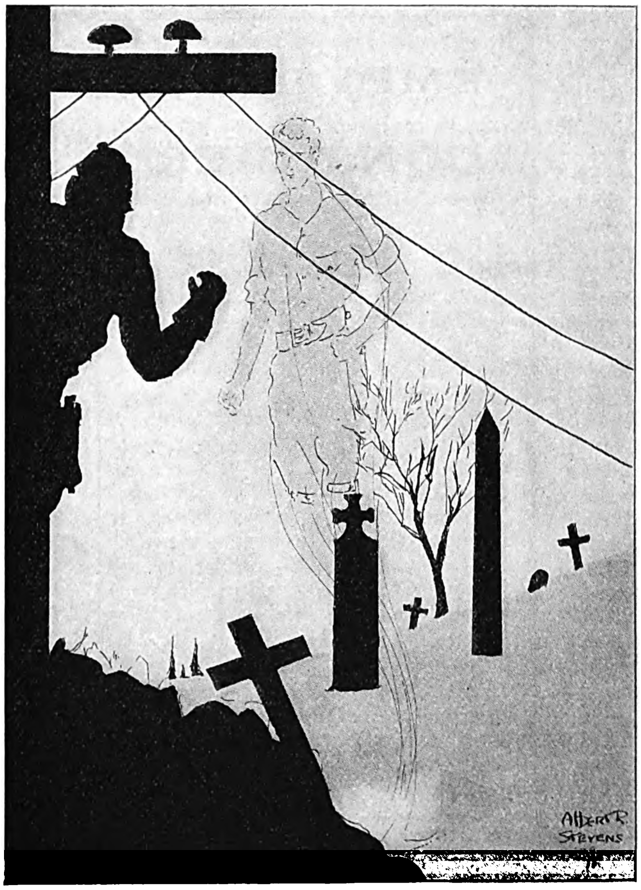
BEYOND the drab town, on the crest of a hill, slender evergreen trees stood like leprous white fingers in their immaculate cloak and swayed eerily over cold, naked stones standing sentinel over mounds that bore mute testimony to the weakness of flesh. Around the plot grew a hedge, offering sanctuary to those sleeping ones within and over it all soughed and shrieked an ice-laden wind.

Just outside the hallowed ground stood the pole, in its jacket of ice, and beckoned lifeless arms to false horizons of midnight while treacherous fires in the sleet lent lavender radiance to the man made cross. Wires of ice swung in from the gloom to pause on the laden crossarm, then writhed on into the opaqueness of the storm.

The weary lineman jabbed spurs into the crust and wormed his way up the pole while the sleet seared his face with fire only to fall in a brittle shawl about his straining shoulders. Numb fingers looped and fastened the safety belt and numb fingers loosened the tie wire about the broken insulator. The thing of clay and ice fell with a muffled thud and bounced, to lose itself in the night beneath the hedge.

Again and again the man strove to lash the wind-whipped wire to the good insulator he held and as often the wire taunted him by slipping from his feeble grasp. Mind willed the hands and arms to do—muscles fought with impulses and the cold seeped in past mackinaw and shirts.

The battle waxed and waned while the man coaxed his poor fingers to do the mind's work. His mood changed; a maniacal desire seized him to weep, to curse, to smash the insulator, his fingers, the universe! Panted oaths took form in whitened breath, to be snatched away by the snarling wind before his ears could hear them. But he knew he was cursing. Hadn't he laboriously formed the words in a mind now sluggish?



A shadow shape took more definite form

"Come, come you, you are my hands! Do this one last job for me, then we can go where it's warm! Help—only need a little help and there isn't a lineman within miles." He sagged down in his belt and lethargy enveloped him.

Below him, he seemed to see a slit of light. The slit widened and widened. Snow and ice and sod rolled back, there was an oblong mellow light, then the light shrank to a slit again, to go out as he watched. A grave had opened and closed!

A shadow shape took more definite form and there stood a smiling man with blue shirt open at the neck and sleeves rolled up. A full tool belt hung around his narrow waist and climbing spurs were strapped to his legs. "Hi, there, Buddy," he hailed.

The lineman's mind brushed a numb hand across a clammy brow and his voice came from far away. "Who—who are you?"

"I'm just one of the sleepers, Buddy. But does it matter? I've been sleeping for a long, long time—since one summer's day. I thought I heard a buddy call for help. But—are you a lineman?"

"You—you—where's your coat?"

"It's pleasant where I've been, Buddy."

"You are a dead man?"

"No, not dead. Just resting."

"I can see through you."

"Am I dead, too, then?"

"Your will is, Buddy?"

Then the linemen were face to face across the pole and a ghostly safety belt was crossed over the one of leather.

"Your hands look warm, but your touch is cold."

"It is only the wind, Buddy."

"I am afraid of you. Who are you?"

"I am the lineman's will to carry you. I'm with you always. Heat and hail mean nothing to you and me—we are linemen. People don't know."

"The job is done."

"It wasn't so tough, was it, Buddy? Now—what are we?"

"We are friends."

"And—"

"We are linemen!"

As the man wended his way down the snow-drifted hill, he seemed to awake from a daze and his heart sang a lilting tune of purloined notes, gathered from the deepest well of his being. An inward prompting urged him to look back to the job he had done, to the place where he had carried on. The place where he had found himself, the place where he had proved himself a lineman.

As he peered back through the swirling scud, he thought he saw a slit of light widen to an oblong radiance, then fade to a slit again. He blinked and could not be sure, then when he looked again he saw nothing of the light and he paid no heed to the little lump that came in his throat only to melt again.

Service Suggestions
NATIONAL ELECTRIC LIGHT ASSOCIATION — COMMERCIAL NATIONAL SECTION
CUSTOMER RELATIONS COMMITTEE
H. T. EAST, *Chairman*, Public Service Co. of Northern Illinois, Chicago, Ill.
To formulate efficient methods of conducting relations between the customer, the public and the supply company, including such matters as taking applications in the office, forms, order routing, inquiries, complaints, meter reading, collections and credits

No. 70 April, 1929

Employee and Consumer

By Customer Relations Committee

Pacific Coast Electrical Association

THE attitude of the individual employee is the greatest single factor in customer relationship. If all employees thoroughly understood their functions and had a proper conception of their obligation to handle each direct or indirect customer contact with efficiency, courtesy, tact and sympathy, good-will would be assured.

To reach this Utopian state, the personnel must be carefully selected, properly trained, and then imbued with the proper spirit. This is no easy task. Because of its admitted importance, the subject is receiving widespread attention in the public utility industry. Many plans are being followed in the effort to obtain the desired result.

Pacific Coast companies last year held an essay contest which did much to gain the interest of their employees, induced them to study the problem and, incidentally, brought them to realize their importance in their respective organizations. The results were eminently satisfactory. Informative material was distributed as a guide and essays were prepared. Prizes were awarded the best papers. The story is reprinted below together with illustrations of the booklet containing the contest rules. The material is excellent, containing many ideas which can be used by other companies who seek to improve customer relations through employee cooperation.

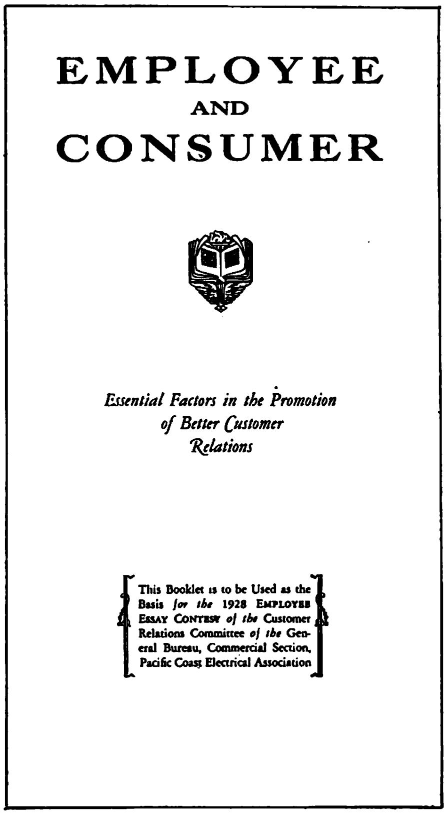
A GUIDE TO
How Can I Best Serve My Company and Its Customers

Your Responsibility

Did you ever realize that what a consumer thinks of you is often what he thinks of this Company? Did it ever occur to you that thousands of this company's consumers have never met more than one or two of our employees? Is not their opinion of our company almost certain to be based on the treatment you have given them?

It follows then, that *you are the company* to the most of the people who patronize us. If you have been courteous, performed your work intelligently, answered questions patiently and have given the treatment you would like to get yourself, then that consumer will form an opinion of our organization that will be a credit to you and to us. If, on the other hand, you have not conducted yourself in quite the proper manner, the impression left with that person is one of antagonism, or at least dislike, which may take years to overcome. Indeed it may never be entirely corrected.

This company is selling a service; not something to be bought by the pound. It is a service that is necessary to the life, health and business of our community; almost as essential as the air we breathe. If we fail in our daily duties and our service ceases, our fellow citizens have nowhere else to turn; they are dependent upon us for something that is vital to their existence. We all of us have, then, in addition to our daily work, a responsibility to our community; the responsibility of furnishing a service which is a necessity of life. Our consumers demand, and rightly so, that this service be rendered courteously, and in a way that will cause the least inconvenience to them. If they receive this kind of service they will be our friends, and our list of friends is the biggest asset of this company.



EMPLOYEE
AND
CONSUMER

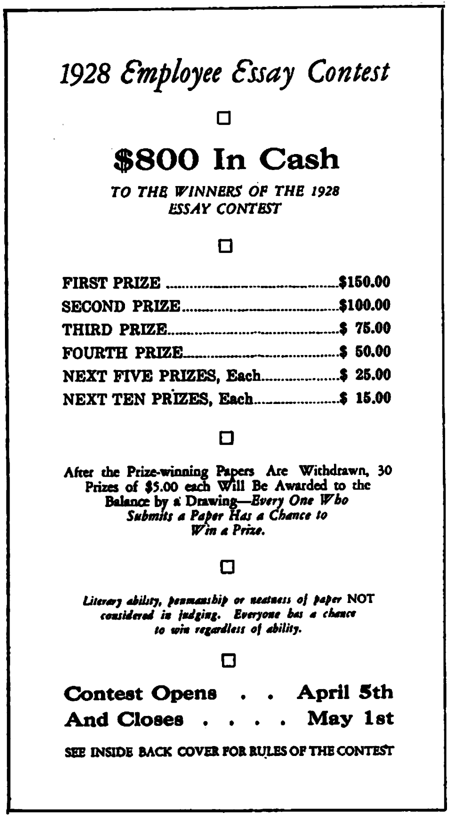
Essential Factors in the Promotion of Better Customer Relations

[This Booklet is to be Used as the Basis *for the* 1928 Employee Essay Contest *of the* Customer Relations Committee *of the* General Bureau, Commercial Section, Pacific Coast Electrical Association]

Cover of booklet
Actual size is 4¼ by 7⅜ inches.

We are striving constantly to improve the quality of our service but we must depend upon you to give it. The largest part of the responsibility of this service rests with *you*. As it depends so greatly on you to see that our customers receive what we are trying to give them, it is natural that we should watch your treatment of them. We have found that people are quick to appreciate earnest efforts in their behalf, and we wish to recognize those of you who put forth these efforts. Need it be said that advancement and promotion will come more quickly to those of you who have made a record of honest endeavor to give service to our customers?

We recognize that mistakes are often committed unknowingly. We are, therefore, giving you a few instructions so



1928 *Employee Essay Contest*

* * *

$800 In Cash

TO THE WINNERS OF THE 1928
ESSAY CONTEST

* * *

FIRST PRIZE	$150.00
SECOND PRIZE	$100.00
THIRD PRIZE	$ 75.00
FOURTH PRIZE	$ 50.00
NEXT FIVE PRIZES, Each	$ 25.00
NEXT TEN PRIZES, Each	$ 15.00

* * *

After the Prize-winning Papers Are Withdrawn, 30 Prizes of $5.00 each Will Be Awarded to the Balance by a Drawing—*Every One Who Submits a Paper Has a Chance to Win a Prize.*

* * *

Literary ability, penmanship or neatness of paper NOT *considered in judging. Everyone has a chance to win regardless of ability.*

* * *

Contest Opens . . . April 5th
And Closes . . . . May 1st

SEE INSIDE BACK COVER FOR RULES OF THE CONTEST

Reproduction of inside front cover of booklet

that you may know exactly how we want you to treat our customers. It is the little things in life that count, and it is the little acts of courtesy and the little efforts toward service which will be remembered by our customers, for they mean so much to them. These instructions refer entirely to how your work should be carried on, and not to the details of the work itself. Routine may change from day to day, but its object will always be more and better service, given with a maximum of courtesy. A thorough understanding of the spirit of these instructions will be invaluable to you in your work. It can always be followed no matter where you are in our organization.

To ignore the instructions that we are giving may be the cause of making enemies for us. To follow them will assist us in giving the service we desire and will build up a record for yourself that will be of great assistance to you in the advancement for which we are sure you are striving. We are offering these instructions to help you make yourself better in your work. If we succeed in that, our company will benefit, and we do not need to emphasize that your prosperity depends upon the success of the company for which you work.

General Instructions

On the following pages you will find instructions to different classes of employees in our company. These have been prepared to guide you in your daily contact with the public. We desire that all employees read all of the instructions contained herein, paying special attention to the ones given under your particular classification.

It should be noted, however, that there are employees in our company whose work does not come under any of these classifications, but who, nevertheless, are in touch daily with some of our customers, perhaps at home or at social gatherings. In the instructions which follow, such employees will find the suggestions which will fit their case and which will be easily recognized by them.

If any doubt arises in your mind as to the particular instructions which apply to your class of work, the head of your department will be glad to discuss them with you.

Courtesy to Your Fellow Employees

Be courteous to your fellow employees. Your first thought will be the question: "What has this to do with the public?" The connection is indirect but very apparent. When you have been treated discourteously by a fellow employee you feel it and are very apt to show it in your manner. If the next person with whom you deal is a consumer, you will probably be a little less considerate toward him even though you may be unconscious of any change in your manner. Courtesy between employees will secure more polite treatment by all of us to our customers.

Apart from this personal side, mutual courtesy will create a feeling of fellowship and friendliness throughout our organization which will make our work more pleasant for all of us. The effect of this spirit cannot help but secure more considerate attention to our consumers.

Co-Operation Between Departments

Quite often in the course of your duties, it may be necessary for you to work with other departments of our organization. When this occurs, approach that department in the spirit of co-operation rather than that of shifting responsibility.

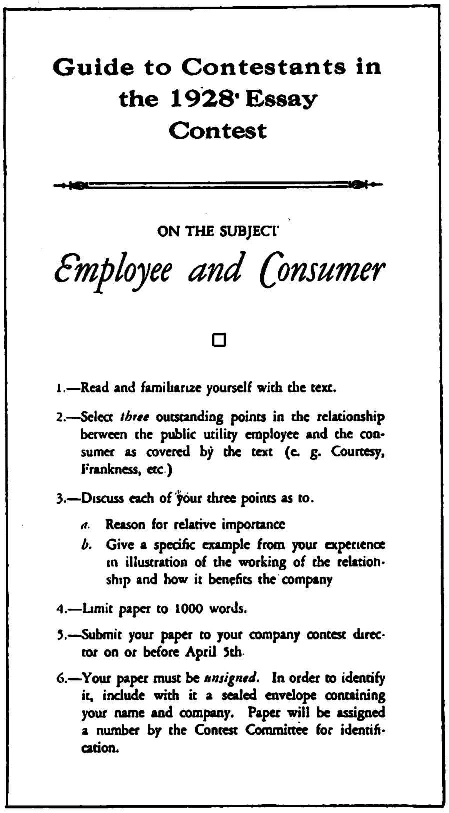
By working in harmony, friction is eliminated and the work is accomplished in less time, with much better satisfaction to the consumer and at smaller cost to the company.

Should an error, made by another department or by a fellow employee be brought to your notice, do not feel, since it is not your mistake, that you have no responsibility in the matter. Correct it if possible, and if you cannot, call it to the attention of some one who can.

An error, however small, if not discovered and corrected at once, may cause needless inconvenience to the consumer and expense and trouble to the company.

Outside Criticism

Never criticise another department or employee of our company when talking to a consumer. If you cannot make a clear explanation of the subject under discussion, simply state that you will have it investigated. Criticism of your organization or any part of it to outsiders shows your lack of confidence in it. Consumers will not have confidence in your statements or judgment if you show that you have none in your fellow employees. When you make such statements you destroy confidence in yourself as well as in our company. You have hurt yourself and have not helped the consumer. Nothing will so quickly destroy our confidence in you as to learn that you criticise our company or your fellow employees when in conversation with our consumers.



Guide to Contestants in the 1928 Essay Contest

ON THE SUBJECT

Employee and Consumer

* * *

1.—Read and familiarize yourself with the text.

2.—Select *three* outstanding points in the relationship between the public utility employee and the consumer as covered by the text (e. g. Courtesy, Frankness, etc.)

3.—Discuss each of your three points as to.

- *a.* Reason for relative importance
- *b.* Give a specific example from your experience in illustration of the working of the relationship and how it benefits the company

4.—Limit paper to 1000 words.

5.—Submit your paper to your company contest director on or before April 5th

6.—Your paper must be *unsigned.* In order to identify it, include with it a sealed envelope containing your name and company. Paper will be assigned a number by the Contest Committee for identification.

Reproduction of inside back cover of booklet

Report Complaints

If any complaint, misunderstanding, or case of poor service on the part of our company comes to your attention outside of your regular work, report it promptly to the department concerned. This will allow us to give much quicker attention to the trouble than might be the case if you did not report it, and it also will be valuable in that the customer will appreciate your interest in him, and will more readily believe that we wish to give him the best possible service.

Rates, Rules and Regulations

Do not attempt to explain rates, rules and regulations to consumers unless you are sure you thoroughly understand them. If you are at all in doubt about the question, refer it to the proper department. There are many mistaken ideas among our consumers about the manner in which our company must operate. You will be doing any consumer a favor and making friends for the company when you assist in clearing up any misunderstanding, either by giving the proper explanation yourself or by referring the matter to the one who can do so.

Service Before Routine

Do not allow yourself to become a slave to routine. While it is necessary that this company work by certain standard rules, yet our first desire always is to render service to the consumer in the best possible manner. To do this it is often necessary for you to depart from our regular procedure, and at times to request the assistance of other employees and departments in order to accomplish the desired results. If you have not the authority to do what seems necessary, consult the head of your department. Your efforts in this respect to assist us in serving the consumer will be very pleasing to us and will work to your advantage.

Proper Use of Telephone

The proper use of the telephone by all employees is one of the most important phases of our company's business. The customer cannot see you and must judge you solely by what he hears and how he hears it. To create a pleasing impression by telephone is not always easy, and the endeavor to do so calls for your best efforts.

Answer your telephone promptly.

Never say "Hello." Answer by giving your name and department. If the call is received directly from the outside without coming through a company switchboard, give the name of the company first, followed by your own name.

Give close attention. The party calling has the right to expect that you are listening to him. Don't force him to repeat due to your inattention.

Keep your mouth close to the telephone and talk in an ordinary tone of voice. Shouting will blur your speech and talking too low will make your words difficult to understand.

Use a pleasant tone. Your voice is your only means of impressing the consumer that you are at his service. Make it courteous.

Don't argue. You are justified in making statements of facts as near as you know them, but don't argue about them. You may be wrong and you weaken yourself and your company by being drawn into an argument.

Let the consumer close the conversation. Don't run the risk of hanging up before he is through.

Say "Thank you" when possible in closing a telephone conversation. This is proper in many more instances than might appear at first thought. For example, it is right that we should thank any customer for calling in regard to a complaint, for we appreciate information as to laxity in our service and we welcome every opportunity to clear up a misunderstanding of any kind with a consumer.

If a person called is not available, be sure that the name and telephone number of the party calling are transmitted to him as soon as possible. Assure the consumer that you will give his call to the person to whom he wishes to speak.

If, by chance, you have been called by mistake and are not the one with whom the consumer wishes to talk, be especially courteous and use your best efforts to get the right one in our organization for him. It was probably not the error of the party calling and your effort to accommodate will be appreciated.

When desired information cannot be given without undue delay, request the name and telephone number of the consumer and say you will call as soon as possible. *Don't fail to keep your promise.*

Above all, be courteous in tone and words; *the consumer can only "see" your voice.*

Salesmen

A neat personal appearance is more essential to the salesman than to almost any other class of employee. First impressions are the most lasting and an untidy appearance will create an unfavorable opinion of you and your company.

Make a practice of shaving daily. Keep your shoes shined and your clothes cleaned and pressed. Clean linen is inexpensive and essential. Be careful of the appearance of your finger nails. Watch these details and avoid any chance of personal criticism.

Avoid the use of tobacco while conversing with others. It may be offensive to them.

If you are a power salesman you must be thoroughly familiar with your company's rates and regulations. If you are selling appliances you must know your merchandise. Such knowledge is absolutely essential if you are to create a feeling of confidence in your prospective customer.

Keep in mind that your prospective customer knows his own business better than you do. He may even know more about the application of your commodity to his business than you do. Go carefully until you know your ground. Show every consideration to his opinions.

Do not make promises unless you know they can be fulfilled.

By many of the people with whom you come in contact you are looked upon as being an authority on company matters. It is therefore essential that you keep fully informed in regard to the operations and general policies of the company. You must use great care in making statements and promises. If you are asked a question and are in doubt as to a correct answer, do not guess. Tell your customer you will obtain the requested information for him. Take no chances on an incorrect or ambiguous reply. It may cause serious trouble for your company and the consumer.

You will often be required to listen to complaints concerning some part of our company business. Give such matters your full attention and refer them to the proper department. We consider such work just as essential to your success as obtaining the new business.

You have an exceptional opportunity in your work to build up good will for your company. Your word is accepted as authority on company business. Use all care that you do not put yourself and the company in an embarrassing position by giving information carelessly, or inaccurately. This will destroy confidence in you and in us.

To a salesman it should not be necessary to speak of courtesy. To be successful you must have it in a certain measure. But we also ask you to give "consideration" to the people with whom you come in contact. It is the highest type of courtesy. Be considerate of their opinions, their circumstances in life, their surroundings. You must avoid the "know it all" attitude. Regardless of what you are doing, it will make friends for you and for us.

Applications and Contracts

In the majority of cases you are the first of our employees with whom our consumers come in contact. The impression made by you at this initial meeting will, to a large extent, determine their idea of this company. First impressions are always most lasting and it is with this in mind that we urge upon you the importance of using every effort to correctly carry out your duties with proper courtesy and consideration to our consumers.

Special attention should be given to your personal appearance. Clean linen and well kept hands are essential.

A thorough knowledge of our rates and regulations is absolutely necessary. Take time to make a full explanation to the consumer of the particular condition applying to his installation. Be most particular in obtaining correct names and addresses from the consumers. Misspelled names may mean a delayed bill and wrong addresses are almost certain to cause a delay in service to the consumer as well as any amount of extra labor and trouble in other departments of the company. You cannot use too much care in this part of your work.

Make your explanations in simple terms. Remember that your everyday "working" language is as so much Greek to the majority of consumers. Talk to them in terms that will be plain to them and don't resort to the routine language of the office.

Be sure that you understand exactly the class of service desired by the consumer and that the correct rates are applied. It is often necessary to question the consumer to a certain extent before you will be certain as to what class of service is desired. Guard against appearing impertinent or inquisitive.

Be careful about giving figures as to monthly cost of service. Consumers often request information as to what their bills will be, and they are quick to take any statement of ours as a promise on our part. Avoid this. If necessary, do not hesitate to refer them to the department which can go into the matter more fully.

Do not make ambiguous statements. They oftentimes cause us a great deal of trouble. Leave no room for doubt in the consumer's mind in regard to any part of your conversation.

Avoid the use of the phrase "You will have to." There are many other ways of telling the consumer that it is necessary for him to do certain things to conform to our regulations. None of us like to be told that we "have to" do anything.

In the case of a public utility particularly, people resent this phrase.

Be interested in the consumers. Make them feel that you have a personal interest in their affairs as far as our company is concerned. They are almost wholly ignorant of our business and a personal interest displayed by you will cause them to feel we are anxious to assist them. Remember that each consumer at the counter is a human being like yourself.

And last, and most important of your duties, is courtesy, always and never failing. It is most productive of success in your work and at times it will be most difficult to achieve. You will have those to contend with that will try your patience until courtesy seems almost impossible. But courtesy on your part will keep you in command of the situation and can never bring criticism upon you. It is your best weapon against the "hard to handle" customer, and your characteristic which will be longest remembered by all of them.

Requests for Information

These may come to you no matter what position you may hold in our organization and it is needless to point out the importance of the replies you give. It is essential that they be correct, and if in any doubt, be sure you obtain the proper information for the consumer.

If you are a telephone operator or information clerk it is your duty to be thoroughly familiar with the work of the various departments and the men in those departments who meet the consumers. Use great care to see that the consumers are directed to the proper person in our organization. It is very annoying for them to repeat their story several times to different people before they reach the right one.

It will often be necessary to question the consumers considerably in order to know where to direct them. This must be done tactfully and courteously. Remember that they probably know nothing of our organization and have little idea of how our work is conducted. Do not become impatient if they do not seem to know just what they want. Our business is a mystery to the most of them.

Cashiers

The payment of any bill is not particularly agreeable to anyone; make the payment of bills for our service as pleasant as possible. Be neat in your personal appearance. Greet each customer with a smile, a pleasant greeting, and a "Thank you" when he leaves. Do not turn away from a customer until he starts to leave.

Do not argue regarding a bill. If you cannot explain the account to the consumer's satisfaction, refer him courteously to the person whose duty it is to investigate such matters.

Make change promptly and carefully.

When currency, from which change is required, is given in payment, leave the currency in sight of the consumer until the change is counted and accepted. You will thus avoid any argument as to the amount of currency given you.

Do not carry on unnecessary conversation while other consumers are waiting.

Do not leave your desk during rest periods unless someone is at hand to relieve you.

Complaints

In interviewing consumers who have complaints, you have one of the most difficult and important duties of any in our organization. Bear in mind that in the majority of cases the consumer is sincere and is convinced that his grievance is legitimate.

Consider that this consumer is entitled to your full attention while you are interviewing him. Endeavor to make him feel that you are taking a personal interest in his case and will see that he gets everything to which he is entitled. To do this successfully you must be sincere in your manner and thorough in looking into the grievance. Don't neglect anything which may have a bearing on the case. It may cause a worse complaint later.

Give those complaints which come in over the telephone the same thought and attention as those reported in person by the consumer.

Be courteous—never risk embarrassing yourself or the company by arguing or insisting that the consumer is at fault. Many times he is not.

Investigate each complaint thoroughly and follow it up until it has been attended to, with the idea always in mind that any trouble that may exist should be corrected as soon as possible.

Do not make promises unless you know without doubt that they can be fulfilled.

Remember that the consumer is not as familiar with our service as you are, and do not confuse him with technical terms. Use simple language in your own explanations. He will appreciate your courtesy in not confusing him with unfamiliar words.

Accounting Department Employees

Although your work does not often bring you in personal contact with the public, yet the quality of your work has an important bearing upon our relations with our customers.

An error in computation leads to a complaint which always takes time and effort of other employees to correct.

But the worst result of an error is the impression left with the consumer that he "caught" us in a mistake.

Make plain figures. Illegible figures lead to mistakes by other employees. When appearing on a bill, they exasperate a customer.

Collectors

Collectors have one of the most difficult jobs in our organization. No one likes to be dunned even though they know the bill is just. To keep the right balance between collections and satisfied consumers is no easy task.

Do not allow yourself to depend wholly upon the "money or meter" policy. While in some cases it is necessary for us to remove a meter for non-payment of account, yet when that meter is out we are earning no money at that address. Removal of the meter should be the last resort.

You will be judged by the skill you show in obtaining payments and terms for settlement without resorting to meter removal. Many delinquent accounts will show possibilities of settlement within our rules, if they are examined with tact, courtesy and a little human kindness. In cases of dispute, don't argue. Verify your facts. The apparent delinquency may have been the result of our mistake.

Be neat in your personal appearance.

Above all, be courteous and polite in all cases. Allow no provocation on the part of the consumer to cause you to forget your dignity and that of the company you represent.

Setting and Removing Meters

Be clean. Self-respect is largely a matter of personal appearance, and you cannot expect the people with whom you come in contact to have respect for you unless you show respect for yourself. Just because you wear working clothes is no reason why you should not shave regularly and keep your hair combed.

Be courteous. Answer questions courteously, even foolish ones. Remember that your work, which appears simple to you, is more or less a mystery to the average man or woman. If the consumer desires to be shown how the meter is read, a short, simple explanation does not take long, and will usually convince the consumer that there is no magic, or what is more important, no guess work about it.

In a great many cases you are the first representative of the company with whom the customer comes in contact, and it is essential that you make a good impression. On entering the porch or house of a consumer, wipe your feet, remove your hat, and while doing your work try to make as little dirt, noise or fuss as possible.

Insofar as the company rules permit, you should check over the consumers' appliances before turning on the service, to make sure that our meter and service are of sufficient size. If there appears to be trouble when the service is turned on, do not condemn the man who made the installation, but look around for the defective device which often is the cause of the trouble.

If you cannot set the meter due to some defect in the job or to some infraction of a rule, such as wrong type of meter box, doors too small, etc., be sure the consumer understands the cause of the delay. Don't say "It's the company rule" and let it go at that, but try to explain the matter from the standpoint of safety or convenience to the consumer.

Leave the consumer's premises in as neat a condition as you found them. Don't walk over lawn or flower beds, and when you enter or leave the yard close the gate after you. These may seem to you to be small details but they mean a great deal to the average housekeeper.

Familiarize yourself with the company

rules which apply to your work and if there is any doubt in your mind as to the proper interpretation of any point, consult the head of your department as to the correct meaning of the point in doubt.

If in some respect the information on your work orders does not agree with what the consumer has in mind, do not try to place the blame on anyone. Explain the discrepancy the best you can without criticism, and clear up the matter when you get back to headquarters. If mistakes in other departments cause you trouble, report them to your superior. Do not tell your troubles to the consumer. Read the paragraph on "Outside Criticism" under "General Instructions."

Meter Readers

Be clean. Shave regularly, and if you wear a white collar, be sure that it is clean; a clean soft shirt collar looks a great deal better than a dirty white one.

Be courteous. Remember that the meter reader is almost the only representative of the company with whom the consumer comes in contact after the original installation is made. Every word you say, every move you make, and particularly your appearance will be a contributing factor in forming the consumer's opinion of, and attitude toward the company.

Don't jump fences or walk on lawns or flower beds. If the meter is in a locked porch or other enclosure, and there is nobody at home, do not force an entrance. Treat the consumers' premises as you would want your own place to be treated.

Be accurate. Remember that bills are made out from your readings and a mistake on your part usually causes a great deal of troble.

Trouble Shooting

You have an exceptional opportunity in this work to make friends for our company and leave behind you a record of courtesy and helpfulness which will be of great assistance to us and to yourself. Every call you make is the result of some trouble or inconvenience to the consumer. He is looking to you for help and when you give him assistance in a polite and courteous manner you leave behind a friend to you and to our company.

On arriving at a house in the daytime go to the rear door; if at night call at the front door to avoid frightening anyone who might be timid.

State your errand briefly and if your company credentials are requested, produce them promptly and pleasantly.

Be sure that you remove your hat upon entering the house. See that your shoes are clean.

If necessary to stand on a chair, ask for a kitchen chair and see that the seat is properly protected by paper or otherwise.

Be sure that any dirt you may have made is cleaned up before you leave.

If the cause of the trouble is not immediately apparent, take sufficient time to locate it and be sure the consumer is satisfied before you leave.

If you are unable to make a permanent repair at the time, see that the proper notation is made on the trouble tag in order that it may be followed up by the right department.

If the trouble requires work for which the company makes a charge or which should be handled by an outside contractor, explain this to the consumer so that it is clearly understood.

If you see any fault or defect in our own system be sure that it is noted and turned in on your report so that it may be corrected by the proper department.

Do not make promises unless you know that they can be fulfilled.

Answer questions asked by the consumer to the best of your ability. Many of them may seem foolish to *you*. But remember that your business is a mystery to most people and a courteous reply will be appreciated by them.

If they desire information which should be given by other departments, put the proper notation on your report so that it may be followed up.

Insofar as your work will permit, keep up your personal appearance. Neatness and cleanliness will go far toward making a good impression on the consumer for the company and yourself.

SERVICE SUGGESTIONS PROVE USEFUL

Several member companies have purchased additional copies of Service Suggestion No. 64 "Tree Trimming from the Public's Viewpoint," and placed them in the hands of each line foreman. Reports received indicate that material improvement was thereafter noted in the line crews tree trimming work and attitude toward property owners' rights.

One company states that copies of Service Suggestion No. 65 "The Telephone as a Service Medium," were distributed to all employes who handle customer calls and that immediate improvement was apparent in the company's telephone contacts.

These reports prove that effective use can be made of additional copies of Service Suggestions and it is the committee's hope that member companies will order additional copies in loose leaf form for distribution to superintendents, managers, department heads, and employes. The real value of the ideas which these articles contain lies in the use made of them.

Orders for additional copies of any issue or standing orders for a number of copies each month may be placed with the chairman. The charge is 5c. per copy. (H. T. EAST, *Chairman*, 1427 Edison Building, Chicago.)

Construction Crews

Normally your work does not bring you in personal contact with many of our consumers. But do not think they do not see you. The public loves to watch a crew of workmen and they are quick to judge a company by the way its men carry out their duties.

You do not have time to carry on conversations with the public, but you will be asked questions now and then. We must leave it to you to know how much time to give to such questions, but we expect you always to be courteous. Rudeness is never called for and is inexcusable.

In working on or near private property, be considerate of the owner. Use the same care with his lawn, fences, flower beds, etc., as you would like to have shown to your own property. There is no excuse for unnecessary damage and we will not tolerate it.

Truck and Automobile Driving

Your car or truck is plainly marked with our company name. You are our representative and we are judged by your actions.

Know the traffic rules thoroughly. Drive carefully. There will be no excuse for breaking the law's requirements.

In heavy traffic don't crowd other cars. Don't be a "road hog." Extend the courtesy of the road at all times.

The public service license on your car does not give you the special privileges of fire apparatus and ambulance. So watch your speed.

Remember that the conduct of automobile drivers is always subject to special attention on the part of the public. Any discourtesy of yours is a reflection on your company.

In Conclusion

When you have read the foregoing instructions carefully, you will, no doubt, have seen that they could have been condensed into one short sentence, one which we have all known for many years, "The Golden Rule." But we have interpreted this rule for you at some length so that you might know exactly what would be expected of you. In this way there will be no misunderstanding by any of us.

As we stated in the beginning, we are selling a service to the public and we desire and insist that this service be rendered with the maximum of speed and courtesy. In no other way can we justify our company's existence. That is the purpose for which we are in business. It is the only way in which we can succeed.

You are looking for advancement and success. In a large measure this depends upon the success of this company, which in turn to a great extent rests with you and depends upon the manner in which you carry on your work.

We have endeavored to blaze the trail to guide you on your way. We know you will not fail in an honest endeavor to follow it.

INTERPRETATIONS of ELECTRICAL DEVELOPMENT

By Statistical Research Department, N.E.L.A.

H. A. Snow, *Chairman, Statistical Committee, Accounting National Section*
H. S. Bennion, *Director of Engineering, N. E. L. A.*
Wm. M. Carpenter, *Research Statistician*
Merle Rainey, *Assistant Statistician*

The Statistical Research Department of the National Electric Light Association will issue monthly, in this section, basic statistical information on the electric light and power industry.

The Department regularly receives comprehensive annual and monthly reports from the larger member companies of the Association, whose total business represents 80 per cent of that of all electric light and power enterprises in the United States. In addition, the Department consults and cooperates with other sources of information.

Member companies are invited to make the fullest use of the statistical bulletins of this Department, published separately, as well as of the current statistical information in the N.E.L.A. BULLETIN, and to more fully utilize the services of the Department.

Current Statistics of the Electric Light and Power Industry

The data here presented are for the total (100 per cent) electric light and power industry and are based on monthly reports received from some 400 companies, representing over 80 per cent of the industry.

	1928	1927	% Inc. or Dec.
DURING MONTH OF DECEMBER			
*Kw-hr. generated	7,396,709,000	....	......
Add—energy imported from Canada and purchased from outside the Electric Light & Power industry	157,509,000	....	......
Less—energy used in electric and other departments	200,000,000	....	......
Total energy for distribution (kw-hr.)	7,354,218,000	....	......
Sales of energy in kw-hr. for:			
Farm service (not involving irrigation)**	4,539,000	....	......
Farm service (involving irrigation)**	20,297,000	....	......
Domestic service	907,614,000	....	......
Commercial service			
Small light and power	1,138,112,000	....	......
Large light and power	3,314,427,000	....	......
Railways and railroads (motive power)	459,236,000	....	......
Other sales to ultimate consumers	209,993,000	....	......
Total sales to ultimate consumers (kw-hr.)	6,054,218,000	....	......
Total revenue (including approximately $8,500,000 from sales for resales and miscellaneous)	$178,789,000	....	......
DURING THE TWELVE MONTHS ENDING DECEMBER 31			
Kw-hr. generated	81,880,000,000	74,335,070,000	10.1
Add—imports from Canada and purchases from outside the Electric Light & Power industry	2,258,000,000	2,610,031,000	−13.4
Less—energy used in electric and other departments	2,600,000,000	2,636,090,000	−1.4
Total energy for distribution	81,538,000,000	74,309,011,000	9.7
New generating capacity installed (kw.)	1,890,400	1,687,000	12.1
Number of new customers added			
Farm customers	1,168,314	1,282,932	......
Domestic customers			
Commercial customers	199,628	279,799	......
Others	3,300	3,249	......
Total customers added	1,371,242	1,565,980	......
Important factors			
Percentage of energy generated by waterpower	39.9	37.4	......
*Average pounds of coal per kw-hr. generated	1.73	1.79	−0.3
Domestic service (residential use)			
Average annual consumption per customer (kw-hr.)	456	429	6.4
Average revenue per kw-hr	6.60c	6.80c	−2.9

*By courtesy of the U. S. Geological Survey with deductions for plants not considered electric light and power enterprises. **As reported by 130 companies only.

Preliminary Figures for the Year 1928

THE summarization of the individual months of 1928 enables us at this time to arrive at preliminary figures for several of the more important statistics of the year's operations and to make a comparison with similar items in previous periods.

While the continued expansion of facilities and the further diffusion of service to all classes of consumers was a feature of public utility operation in 1928, an analysis of these trends discloses some interesting facts. The actual generation of energy by the electric light and power industry itself increased during 1928 by 7,545,000,000 kwhrs. (or by 10.1 per cent) over the generation during 1927, as compared with an increase of 6,560,000,000 kwhrs. (or by 9.7 per cent) in 1927 over 1926. Some qualifications must, however, be immediately made in this comparison. February had one more day in 1928 (which accounted for 220,000,000 kwhrs.) and some of the gain was at the expense of power imported from Canada and purchased from enterprises not public utilities. Eliminating the extra day, the net gain in the grand total of electricity, generated and purchased by the electric light and power enterprises of the United States during 1928, was 6,973,000,000 kwhrs. (or of 9.1 per cent) over 1927. This compares with corresponding figures of 7,573,000,000 kwhrs. (or of 10.9 per cent) in 1927 over 1926 and with approximately 8,200,000,000 kwhrs. (or 13 per cent) in 1926 over 1925. These comparisons again emphasize the importance of the fluctuations of the activity of industry and trade in the fortunes of the electric light and power business.

The number of new customers added to the lines of the various electrical enterprises during 1928 was 1,371,000, as compared with a net addition of 1,566,000 during 1927 and of 1,654,000 during 1926. The progressive decrease in the addition of new consumers may probably be explained by the facts that practically every community with a population of more than 1000 people now enjoys the benefits of electric service, that the number of unwired houses in the older cities and towns has rapidly diminished and that the decline in residential construction (which began early in 1928 and is proceeding with increasing severity up to the present date) has begun to make itself felt. A very hopeful sign, however, is found in the steady increase in the annual use of electricity by the average domestic consumer, which is accompanied (and, perhaps, to a large extent caused) by a corresponding decline in the average cost of electricity. This gain of 27 kwhrs. per year (or 2¼ kwhr. per month) per consumer compares with a gain of 25 kwhrs. per year during 1927 and the further possibilities which the continued stimulation of this market holds in the increase in the comfort and convenience of the home are very evident.

These figures are, of course, tentative and will probably be subject to minor revisions when the complete report, assembled from the annual statistics returned by the industry, is finally compiled.

Basic Information on the Electric Light and Power Industry

As of December 31, 1928

The data included in this table are the basic factors of the electric light and power industry and will be brought up-to-date at the end of each month and published in each issue of the BULLETIN.

1.	Value of plant and equipment (estimated)	$10,000,000,000
2.	Total generating capacity in kw	27,310,400
	Steam	19,585,400
	Waterpower	7,429,100
	Internal combustion	295,900
3.	Total number of customers served	23,270,400
	Farm customers	†135,000
	Domestic customers	18,937,700
	Commercial customers	4,173,600
4.	Population in electrically lighted homes (Electrical World)	81,500,000
5.	Percentage of homes which are served with electricity	66
6.	Miles of transmission lines (11,000 volts and above) (1927) (circuit miles)	132,000

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†As reported by some 120 companies only.

Number of Homes Served with Electricity by the Electric Light and Power Industry *

(As determined from N. E. L. A. monthly reports received from some 400 companies and prorated to the total in each State)

	Total Number of All Homes	Number of Homes Receiving Electric Service On Dec. 31, 1927	Number of Homes Receiving Electric Service On Dec. 31, 1928	Homes Wired During 1928	Per Cent of Homes Served on Dec. 31, 1928
Alabama	575,000	134,000	148,000	14,000	26
Arizona	118,000	36,000	38,000	2,000	32
Arkansas	455,000	107,000	115,000	8,000	25
California	1,220,000	1,303,000	1,374,000	71,000	(a)
Colorado	268,000	169,000	175,000	6,000	66
Connecticut	392,000	326,000	343,000	17,000	88
Delaware	61,000	29,000	32,000	3,000	52
District of Columbia	127,000	109,000	119,000	10,000	94
Florida	358,000	202,000	201,000	1,000	56
Georgia	715,000	136,000	148,000	12,000	21
Idaho	131,000	63,000	70,000	7,000	54
Illinois	1,816,000	1,471,000	1,524,000	53,000	85
Indiana	819,000	516,000	529,000	13,000	65
Iowa	608,000	328,000	342,000	14,000	56
Kansas	471,000	275,000	286,000	11,000	60
Kentucky	596,000	181,000	196,000	15,000	33
Louisiana	435,000	110,000	116,000	6,000	27
Maine	200,000	130,000	134,000	4,000	67
Maryland	378,000	236,000	255,000	19,000	67
Massachusetts	1,004,000	851,000	896,000	45,000	90
Michigan	1,106,000	857,000	921,000	64,000	84
Minnesota	623,000	385,000	398,000	13,000	64
Mississippi	417,000	52,000	62,000	10,000	15
Missouri	885,000	542,000	571,000	29,000	64
Montana	148,000	67,000	70,000	3,000	47
Nebraska	337,000	170,000	178,000	8,000	53
Nevada	22,000	14,000	15,000	1,000	68
New Hampshire	114,000	90,000	113,000	23,000	99
New Jersey	897,000	790,000	859,000	69,000	96
New Mexico	91,000	23,000	23,000	.....	25
New York	2,840,000	2,725,000	2,909,000	184,000	(a)
North Carolina	591,000	161,000	174,000	13,000	30
North Dakota	134,000	46,000	54,000	8,000	40
Ohio	1,720,000	1,228,000	1,312,000	84,000	76
Oklahoma	545,000	177,000	199,000	22,000	37
Oregon	227,000	173,000	191,000	18,000	83
Pennsylvania	2,300,000	1,461,000	1,614,000	153,000	70
Rhode Island	168,000	141,000	155,000	14,000	92
South Carolina	391,000	90,000	95,000	5,000	24
South Dakota	157,000	54,000	59,000	5,000	37
Tennessee	570,000	164,000	172,000	8,000	30
Texas	1,255,000	491,000	537,000	46,000	43
Utah	119,000	104,000	106,000	2,000	89
Vermont	86,000	60,000	65,000	5,000	75
Virginia	552,000	191,000	204,000	13,000	37
Washington	421,000	300,000	329,000	29,000	78
West Virginia	378,000	121,000	130,000	9,000	34
Wisconsin	691,000	444,000	471,000	27,000	68
Wyoming	64,000	29,000	30,000	1,000	47
Total United States	28,596,000	17,860,000	19,057,000	1,197,000	66

(a) Over 100 per cent. Due to either classification of meters or estimated population.

*Subject to change to agree with the final data when summarized and issued by the United States Bureau of Census.

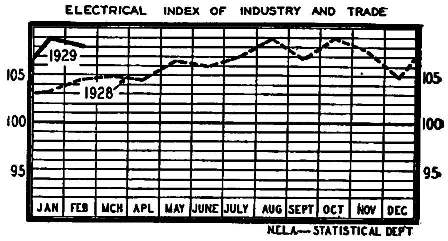
N. E. L. A. Index of Industry and Trade

THE N. E. L. A. Index of Industry and Trade showed a slight drop in February, preliminary figures indicating a decrease of nearly 1 per cent over the high level of January but still 3.5 per cent over February of last year. Extraordinary industrial activity, as indicated by the production of electricity, is shown for the region east of the Mississippi and north of the Ohio and Potomac Rivers. The Index, month by month for the last two years, stands as follows:

Electrical Index of Industry and Trade

	1927	1928	1929
January	104.9	103.2	109.0
February	103.8	104.7	108.1*
March	106.9	105.0	
April	106.8	104.6	
May	106.3	106.6	
June	106.1	106.0	
July	104.8	107.1	
August	104.9	108.9	
September	104.8	106.8	
October	102.6	109.0	
November	102.9	107.8	
December	103.1	105.0	

*Subject to revision.



The N. E. L. A. Index of Industry and Trade is based upon the deviation of the total output of electricity by all agencies which contribute to the public supply plus imports from Canada, from a computed "normal" figure for each month, which "normal" is adjusted for the continued growth of the light and power industry and is further corrected for season variation.

Note on Adjoining Table of Homes Receiving Electric Service

DURING the year 1928 approximately 1,200,000 homes received the benefits of electric service for the first time. This brings the total number of homes served up to 19,057,000. In other words, two-thirds of all the homes in the United States are being served electrically. Since 1918, over 12,000,000 homes have been connected to the systems of the electric light and power companies.

The adjoining table shows the number of homes receiving electric service by States on Dec. 31, 1928, and also shows the increase in the number of wired homes during the past year.

These figures must be regarded as preliminary and subject to some revisions so as to tally with the forthcoming 1927 Census of the Electric Light and Power Industry.

Increase in Factory Power

AT the end of 1927, according to preliminary figures released by the United States Bureau of the Census, the average American wage earner in industry had at his disposal 4.67 horsepower, an increase of 0.41 horsepower (or nearly 10 per cent) over the 4.26 shown by the Census for 1925.

The Bureau of the Census reports a grand total of all machinery installed in the manufacturing establishments of the United States, as of Dec. 31, 1927, of 39,032,014 horsepower. This is an increase of 3,365,070 horsepower (or 9.1 per cent) over the figures of two years before. At the same time, the average number of wage earners during 1927 is given as 8,351,257, a decrease of 30,254 (or 0.4 per cent) from the average number employed in 1925, and of 425,379 from the figure reported for the 1923.

"This remarkable increase in the amount of machinery, which has placed at the elbow of the American working man more power than in any other country of the world," states the Statistical Research Department of the National Electric Light Association in an analysis of these figures, "seems to have been accompanied by a corresponding increase in production. If we accept the not-unreasonable rule that the 'value created by manufacture' must be corrected by the changes in the level of wholesale prices in order to give an accurate comparison between these two years, it becomes evident that actual output of goods has kept pace with the growth of productive capacity. This is most important, because, after all, production is accomplished not by the mere fact of installation of machinery, but by its actual operation, and the true measure of the successful application of power is not horsepower of machines but the sum total of goods finally turned out.

Rise in Copper Prices Affects Utilities

THE present level of copper prices has reached 24½c. per lb. as compared with the average of 14½c. per lb. prevailing from 1923 to the beginning of the recent rise. If the present price persists, the 1,000,000 tons of primary metal which the United States will probably produce during 1929 will cost the consuming public an additional amount of at least $200,000,000, according to the Statistical Research Department of the National Electric Light Association.

The public utilities of the United States, together with the manufacturers which make the appliances for electrical use, take one-half of all copper used in this country. In detail, this consumption of copper is roughly as follows:

	Per cent
Telephone and telegraph	11
Light and power lines	14
Electrical maanufacturers	23
Sundry allied lines	2
Total	50

The net consumption of the electric light and power industry (that is, total new construction less old copper taken down and recovered) is in excess of 100,000 tons per year. This is used in transmission lines, distributing systems, and wiring installations. An increase of ten cents per pound in the cost of electrolytic copper before fabrication over the average of the past five years means a rise of something over 12 cents per pound in the price of finished wire. This represents an added expense in the construction of new facilities of at least $25,000,000 per year.

Applied to farm electrification, it means an added cost of $40 to $67 for electrifying each new farm. With an average of three farms per mile, the total copper wire used is in the neighborhood of 1,000 lb. for light service and above 1,650 lb. for heavier service. At present prices, this means an increase in cost of $120 per mile—or $40 per farm—for light service, and of more than $200 per mile—or $67 per farm—for the heavier uses.

Applied to the telephone and telegraph industry, the increase in the cost of copper means about $20,000,000 added to the construction budgets of the year; to the electrical manufacturers it means nearly $50,000,000; to the automobile industry (which, including repairs and replacements, consumed about 100,000 tons last year) it means another $25,000,000.

ACCOUNTING SECTION

J. F. FORD, *Chairman* FRED W. HERBERT, *Accounting Director, N. E. L. A.*

Decisions on Questions of Interpretation of the Standard Classification of Accounts

By CLASSIFICATIONS OF ACCOUNTS COMMITTEE

THE Classification of Accounts Committee of the Accounting National Section stands ready to answer questions concerning the interpretation or application of the Standard Classification. The following questions have recently been considered and the answers represent the substantially unanimous opinion of the Committee for the current fiscal year.

Duplicate Interest on Refunding Bonds

Question.—A utility recently called for redemption three bond issues, one of which was an underlying issue, while the other two were high coupon rate issues, which it wished to get rid of. The issues were refinanced by bonds carrying lower coupon rates. Due to the fact that the new issue had to be provided and the money therefrom supplied for some time prior to actually taking up the bonds to be retired there was a substantial total of duplicate interest charges. How should this be accounted for?

Answer.—It is logical to consider the duplicate interest as a refinancing cost to be charged to suspense and amortized over the life of the new bonds.

NOTE: One member of the Committee expresses a somewhat different view, holding that on the facts as stated, the duplication interest should be charged direct to interest deductions for the period during which it accrued, but adds that further knowledge of the concrete situation might lead him to modify this opinion.

Cost of Cooling Tower, Pumps, and Coils Used in Connection with a Diesel Engine

Question.—In instances where a cooling tower, pumps, and coils are used in connection with the operation of a Diesel Engine should they be considered part of the engine with their costs chargeable to Account Number 325 "Internal Combustion Engines" or should the cost be charged to Account 327 "Miscellaneous Power Plant Equipment"?

Answer.—The cost of a cooling tower, pumps, and coils used in connection with a Diesel Engine should be charged to Account 325 *"Internal Combustion Engines."*

NOTE: One member of the Committee thinks Account Number 327 "Miscellaneous Power Plant Equipment," more appropriate.

Storage Battery Used in a Sub-station

Question.—Under Account Number 328 "Substation Equipment" it is stated "This account does not include storage batteries nor laboratory instruments and apparatus and other equipment coming within the scope of Account Number 344 "General Equipment." This company is installing one 125 Volt KFX-11 Exide storage battery at one of its sub-stations. It does not appear to be covered by the definition of Account 329 "Storage Battery Equipment" nor of Account 344 "General Equipment." Should it be charged to Account Number 328 "Sub-station Equipment."?

Answer.—Although the language of Account Number 328 *states that it does not include storage batteries, it is not the intention of the account to exclude therefrom small storage batteries such as might be used for working a switch or for some other purpose purely incidental to the operation of a sub-station. The wording of the account was undoubtedly meant to call attention to the fact that large storage batteries designed to carry temporarily the load on some outgoing circuit were provided for in Account Number* 329 *"Storage Battery Equipment." The type of storage battery described in the inquiry is neither "Storage Battery Equipment," coming within the definition of Account Number* 329, *nor "General Equipment" and its cost should unquestionably be charged to Account Number* 328 *"Sub-station Equipment."*

ENGINEERING SECTION

E. C. Stone, *Chairman* **H. S. Bennion**, *Director of Engineering, N. E. L. A.*

Miniature Control Switchboards

New Development in Electrical Control Reduces Switchboard Length in the Ratio of Ten to One

Article by a sub-group of the Generating Stations Subcommittee of the Electrical Apparatus Committee, Engineering National Section.

THE development of the miniature switchboard has been brought about by a demand for the concentration of the control of important and complicated electrical installations into the hands of one man, and also for the reduction to a minimum of the space required for the control equipment. Its popularity is rapidly increasing due to its decreased installation cost, its freedom of location, its economies in space and operation, and its adaptability to one man control.

The fundamental principle which has made the miniature switchboard possible is that of using relay switches or contactors, located close to the apparatus to be controlled, for handling the heavy currents which actuate the controlled devices, thus permitting the transmission from the control switchboard itself of only sufficient energy to operate or to initiate the operation of these relay switches. The adoption of this relay principle has made it possible to utilize much lower voltages and smaller currents at the control board, and hence to greatly reduce the size of the control equipment, of the control board itself, and of the interconnecting wires.

As a result of this arrangement, thousands of feet of conduit, and hundreds of thousands of feet of rubber covered control wire required by the conventional switchboard layout in a modern generating station are eliminated. In their stead a few multiconductor telephone cables, either of the ordinary type, or if considered necessary, of the special type used by steam railroads, are used to convey the miniature control currents to the relay switches. Both the first cost and the installation cost of such cables are very much less than for the corresponding rubber covered control cables and conduit required by the conventional type of installation.

Another important advantage resulting from the adoption of the miniature switchboard principle is that the location of the control board itself is not necessarily determined by that of the apparatus controlled. Such a switchboard may be placed almost anywhere, even in another building at some distance from the one housing the apparatus controlled, since the use of the telephone cables for the interconnection largely removes the limitations inherent in the use of the usual heavy control wiring. In fact by a suitable selection of instruments a miniature switchboard will function successfully, even over a distance of eight or ten miles.

In order to reduce to a minimum the size of the control switchboard, it was first necessary to omit all equipment not absolutely required, and then to reduce the size of what was left. For example, meters are not placed on miniature switchboards, unless it is essential that the chief operator be constantly apprised of their readings. Miniature control switches are used and even the indicating lamps are of telephone type.

The indicating lamps used for this service have been especially designed to have a longer life than the conventional telephone lamps, since, instead of being used intermittently as in telephone service, they are used for continuous indication. They are so designed that their brilliancy is not diminished until after a service of, say, eight months. They are interchangeable with standard telephone lamps, thus permitting the use of standard telephone lampholders.

The control switches, or keys, used on the miniature switchboard require a circuit of approximately 60 volts direct current, and as they have to handle only miniature currents, the relay switches which they control being designed to respond to miniature electrical impulses, they can be of minature size.

In cases where meters are required, miniature meters are available in the form of indicators actuated by telemetering devices installed at the apparatus controlled, the indications being transmitted to the miniature board over a few telephone wires.

Although miniature switchboards, together with their relaying devices and switching equipment mounted at a distance therefrom, are slightly more expensive in first cost than the conventional type of switchboard, this is more than offset by their decreased installation cost. In a recently built hydro-electric plant, for instance, a saving of $10,000 per generator was made by the adoption of the miniature switchboard arrangement.

The development of the falls of the Ohio River near Louisville permitted a trial of the miniature switchboard application to large hydro-electric generating stations. In this installation the oil circuit breakers are conveniently located between the generators and the busses, the disconnecting switches are located in immediate proximity to the oil circuit breakers, and the automatic relays, relay switches, and remaining switching equipment has been placed in "cubicles" located immediately adjacent

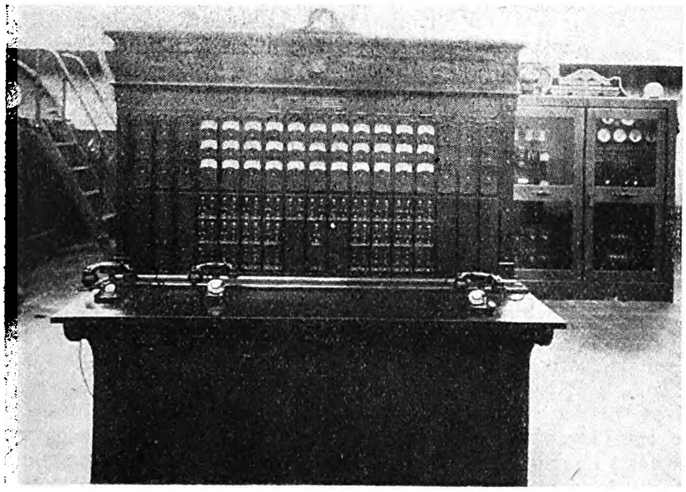


Fig. 1

Miniature control switchboard of Louisville Hydro-Electric Co. Front view

In the background appears one of the unit "cubicles" containing the relay switches, automatic relays, meters and auxiliary switching equipment.

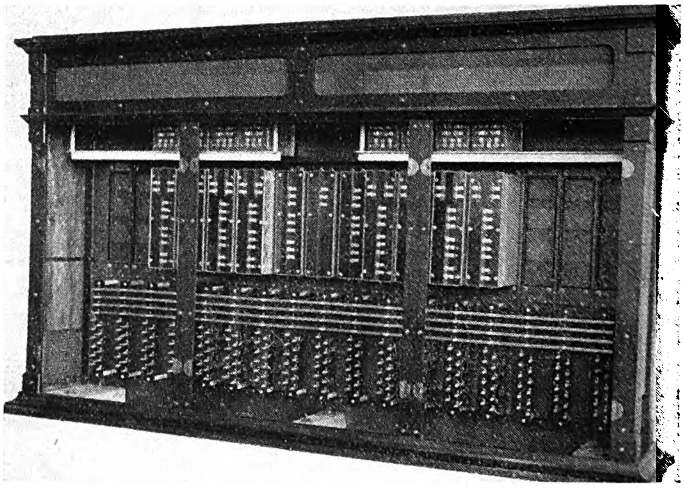


Fig. 2

Miniature control switchboard of Louisville Hydro-Electric Co.

Rear View with Doors Removed.

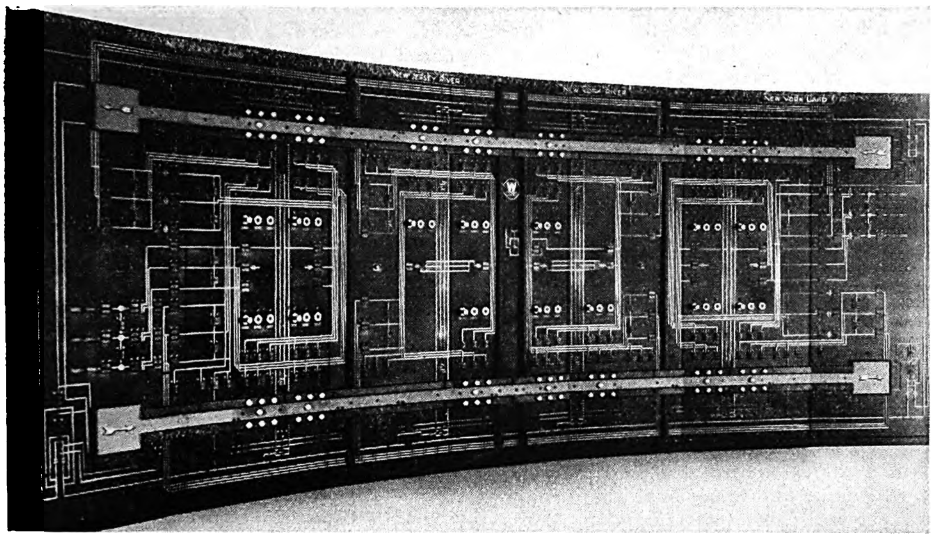


Fig. 3
Miniature control switchboard for Holland Vehicular Tunnel under Hudson River

to each generator. The telemeter indicators, control switches and indicating lamps are installed on a miniature switchboard, which has been placed in a central location on the main floor of the station. For this switchboard a panel width of three and one-half inches was adopted in contrast to the average panel width of twenty-four to twenty-eight inches in the conventional switchboard, thus reducing the total length of the board from about forty feet to five feet. A front view of the Louisville installation is shown in Fig. 1 and a back view, with doors removed, in Fig. 2.

The opening of the Holland Vehicular Tunnel, under the Hudson River, after seven years of construction work, having been hailed as one of the outstanding engineering achievements of the recent past, it is interesting to note that a miniature switchboard installation has been included as part of the safety measures taken in the design of this project. It requires no great effort of the imagination to picture what might happen if either the illuminating or ventilating system of this tunnel were to become inoperative during the period when traffic is heavy or, for that matter, at any time. What is undoubtedly the most elaborate system of ventilation of its kind has been installed to purify the air in the tunnel. Some idea of the magnitude of the ventilation scheme may be gained from the fact that eighty-four motor-driven fans are required supplying almost 4,000,000 cubic feet of air per minute. In addition, electrical energy must be supplied to a very complete system of signals and illumination.

In order to obtain the most intelligent as well as the safest operation of all this electrical equipment, it is essential that the control of every piece of apparatus be brought to one central point and be so arranged that one man can easily follow what is happening and control the equipment accordingly. For this purpose, the miniature central control or supervisory board shown in Fig. 3 has been installed.

This board is curved in such a manner that the operator can easily view any part while sitting at his desk in front of it. It will be noted that the board is divided into four sections corresponding to the natural divisions of the tunnel; the two large castings running horizontally correspond to the north and south tubes of the tunnel and the squares at the ends graphically represent the entrances or plazas.

The indicating apparatus on this board is very complete. The illumination of large lamps on the raised portion of the miniature tunnel indicate what sets of ventilating motors are taking care of various portions of the tunnel and other lamps indicate whether the respective motors are being operated from New York or New Jersey power houses. Carbon-monoxide recording apparatus has been installed in the tubes and will, in case of danger, give the necessary indication on the miniature switchboard. A number of small fire-alarm lamps are located in line with the carbon-monoxide-alarm lamps and are arranged to glow dimly at all times to indicate that the circuits are in operating condition but to become brightly illuminated at the position corresponding to any fire alarm turned in.

From the foregoing descriptions of the supervisory control board, it is seen that the operator can tell exactly how every piece of apparatus in this complex layout is performing. Here there are two tubes, each being more than 9000 ft.

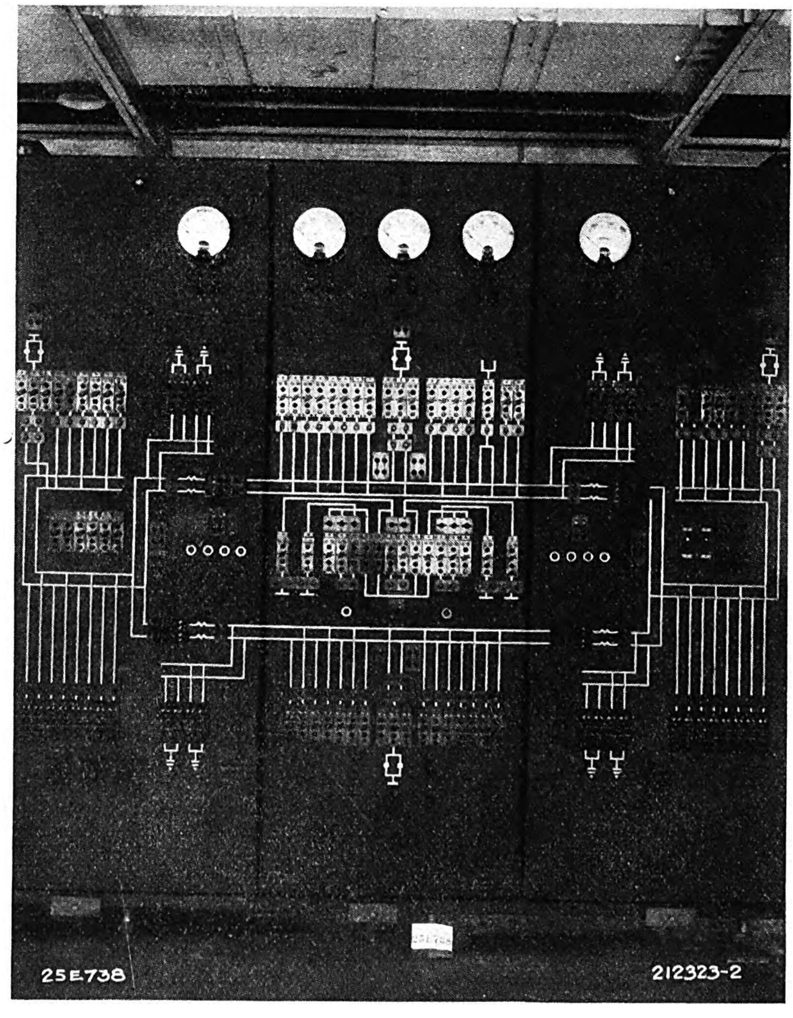


Fig. 4
A miniature control switchboard used in connection with a "Supervisory Control" system

in length and having electrical equipment at widely scattered locations, and still one operator has the control of all of it at his fingertips on a board which has a total length of only twenty-two feet.

The central control board in the Holland Tunnel has been referred to as the supervisory board. From a non-technical point of view, this term is surely correct since the operation of the entire system is supervised from this board. From an engineering point of view, the term "Supervisory Control" has come to mean one in which the control is transmitted through selective relay circuits rendering it unnecessary to have an independent circuit between each control switch and the apparatus controlled. Incidentally, although it is not generally referred to as such, the control board of a supervisory system undoubtedly represents one of the most miniature of switchboards. An installation of such a supervisory system is shown in Fig. 4.

In summation, it may be said that three different types of centralized control have been referred to above: one which is replacing the older "benchboard" type in the generating station; one which supervises such an electrical installation as that in the Holland Tunnel; and one which permits supervisory operation of the many units, or substations, of an electric distribution system. Each of these types brings to one point the supervision of an entire system or of a definite part of the system, together with all information required for correct supervision. The use of a miniature board at the central point reduces the space requirement to a minimum and makes it possible for one man to follow what is happening at all points and to operate the system accordingly. These advantages, in turn, make the miniature switchboard the most satisfactory, safest and most economical installation.

For many years there has been a trend toward greater and greater concentration of the control of electrical installations. Some fears were expressed in the early days as to the wisdom of concentrating the control for large power plants in a single room, or out of sight of the apparatus controlled, but with time and experience these fears have gradually been dissipated until today there is little hesitation in locating the control devices for any sort of an electrical installation at any convenient point which may be desirable, regardless of its location with respect to the controlled apparatus. This attitude has naturally resulted in a desire to reduce to a minimum, both the size and cost of the control apparatus itself and also of the connecting wiring between the control apparatus and the apparatus controlled. These ends have been accomplished by the development of the miniature control switchboard.

Transformers and Regulators

By Raymond Bailey

Chairman, Transformer and Regulator Group, Substations Subcommittee

THIS ARTICLE contains reports of the various studies and activities relating to transformers and regulators conducted by the Substations Subcommittee of the Electrical Apparatus Committee. A considerable number of studies are being made, results of which cannot be published in the form of serial reports. Feeling that the results of certain of these studies are of general interest they have been summarized in the following article.

Operations of Transformers on a Temperature Basis

The question of loading transformers on a temperature basis, taking advantage of the fact that ambient temperatures particularly at the time of peak loads are in a great many cases well below the standard of 40 deg. C., is one of considerable economic importance in permitting greater loads to be carried with a given investment. This subject was included in an inquiry sent to operating companies throughout the country, and in replying, a number of companies stated that they had given consideration to this matter. Several specific cases were reported where transformers had carried loads in excess of nameplate rating. A few companies stated that they operate transformers on a maximum temperature basis in emergencies.

Although one company which has been loading transformers according to ambient temperatures for the past few years found that maximum temperature operation was not entirely satisfactory because of the fact that temperature gradients are increased and hot spots may develop without corresponding rises in observable temperatures, it appears that operation on a temperature basis has in general been satisfactory, particularly if the transformer is equipped with a winding temperature indicator. No data, however, are available on the effect of the higher average temperatures on the life of insulation.

On the other hand, several companies feel that transformer loading cannot in general be increased over nameplate rating because of increased oil sludging, increased voltage regulation, increased maintenance costs, or because of high ambient temperatures in their respective territories. However, this is not a reason for not operating upon a temperature basis since no higher operating temperatures would result than if fully loaded with an ambient of 40 deg. C.

After further consideration of the question of transformer operation on a temperature basis at the Philadelphia and Cleveland meetings of the Electrical Apparatus Committee, the following resolution referring to the proposed A. I. E. E. rules on this subject was passed at the Cleveland meeting:

> *Resolved:*
>
> That paragraphs 13-600, 13-601, 13-602, and 13-603 on recommendations for the operation of transformers on a temperature basis published by the A. I. E. E., in the "Report on Standards for Transformers, Induction Regulators and Reactors (proposed revision of present standard, section 13)" dated August, 1928, are hereby approved by the Electrical Apparatus Committee as a suitable basis for securing operating experience on the effect of operation of transformers at ambient temperatures other than 40 deg. cent. for air and 25 deg. cent. for water.

The paragraphs of the A. I. E. E. report on Section 13 of the Standards referred to in the resolution are as follows:

Recommendations for the Operation of Transformers, Induction Regulators and Reactors

13-600 Limiting Observable Temperature of Oil—The oil in which apparatus is permanently immersed should under no circumstances have a temperature, observable by thermometer, in excess of 90 deg. cent.

13-601 Operation at Rated Load—Apparatus conforming with the Standards for rating is suitable for carrying rated load continuously provided that the temperature of the cooling medium does not exceed 40 deg. cent, for air or 25 deg. cent. for water.

13-602 Operation with Cooling Air and Water Exceeding 40 Deg. Cent. and 25 Deg. Cent. Respectively — For apparatus conforming with the Standards for rating, the load should be reduced two per cent below the rated load for each degree that the temperature of the cooling air exceeds 40 deg. cent., or that the temperature of the cooling water exceeds 25 deg. cent. However, the use of apparatus in cooling air exceeding 50 deg. cent. or in cooling water exceeding 35 deg. cent. shall be considered as special.

13-603 Operation at Loads Greater than the Rated Load — (a) Apparatus not Equipped with a Winding Temperature Indicator: Apparatus not equipped with a winding temperature indicator may be loaded continuously one per cent above rated load for each degree centrigrade that the temperature of the cooling medium is below 30 deg. cent. for air or 25 deg. cent. for water.

Thus, for example, when the temperature of the cooling medium is 0 deg. cent., the permissible continuous load is 130 per cent of rated load for air-cooled apparatus and 125 per cent of rated load for water-cooled apparatus.

Loads greater than 130 per cent of rated load for air-cooled apparatus or 125 per cent of rated load for water-cooled apparatus shall not be applied under any conditions even though the temperature of the cooling medium be lower than 0 deg. cent.

(b) Apparatus Equipped with a Winding-Temperature Indicator: Apparatus equipped with a winding temperature indicator may be loaded continuously in excess of rated load provided the indicated winding temperature does not exceed the following limits:

For indicators marked in terms of:
Hottest-spot Temperature, 95 deg. cent.
Embedded Detector Temperature, 90 deg. cent.
Resistance Method Temperature, 85 deg. cent.

(c) Oil Temperatures: Oil temperature alone is an inadequate criterion of the winding temperature because of the increased temperature drop through the insulation at low temperatures of the cooling medium and of the time lag between the winding and oil temperatures.

Loading apparatus on the basis of oil temperature alone as a guide is not recognized by the A. I. E. E.

Standard Ambient Temperatures for Rating Electrical Machinery

At the Bellagio meetings of the International Electrotechnical Commission certain colder climate countries in Europe expressed a desire to change the present standard ambient temperature of 40 deg. C. for rating electrical equipment to 35 deg. C., or possibly 30 deg. C. The U. S. National Committee of the I. E. C. opposed this change, and since the Bellagio meeting, has reaffirmed its stand. This question was considered by the Electrical Apparatus Committee at the Cleveland meeting, and it was the consensus of opinion that no change was desirable at this time in the present standard ambient temperature, particularly in view of the fact that on transformers at least it will be possible under the proposed A. I. E. E. rules to take advantage of ambient temperatures lower than the standard. The following resolution was therefore passed by the Electrical Apparatus Committee:

Resolved:

> That the Electrical Apparatus Committee subscribes to the recommendation of the U. S. National Committee of the I. E. C., that no change be made in the present standard ambient temperature of 40 deg. cent. for rating electrical equipment.

Standardization of Transformer Impedance

In view of the fact that the tendency in manufacturing seems to be toward higher impedance in transformers, with the result that difficulty is sometimes experienced in paralleling and banking new and old transformers, it has been suggested that some standard be adopted for transformer impedance. More than half of sixty companies replying to an inquiry on this subject answered in the affirmative to a question as to whether such standardization would be of material value to them. Several companies pointed out the relation between impedance and short circuit currents, and some suggested that several different values of impedance might have to be standardized. Some pointed out that standardization would hamper developments in design.

Transformer Impedance Tolerance Factors

Consideration has been given to international standardization through the I. E. C. of the plus or minus 10 per cent tolerance factor for the transformer impedance as adopted some time ago by the N. E. M. A. Some members of the Electrical Apparatus Committee have taken the position that this value is too liberal, as it may result in considerable loss of transformer capacity where transformer banks are operated in parallel. It appears that if a plus or minus 5 per cent tolerance factor is specified there is no difficulty in obtaining transformers having impedances within 5 per cent of the guaranteed value, and the opinion has been expressed that a tolerance factor of plus or minus 5 per cent should be entirely satisfactory for all transformers, with the possible exceptions of certain three winding transformers and those of a special nature. It seemed desirable that an American standard should first be agreed upon before this matter is brought up for international standardization, and an inquiry was therefore addressed to the membership of the Electrical Apparatus Committee on this subject. In response to this inquiry, twenty-six companies submitted data covering a total of 570 transformers of so-called normal design, including transformers with capacity rating up to 25,000 kv-a. and voltage ratings up to 140,000 volts. Of the 570 transformers, 432, or 74 per cent were found to have a tested impedance within 5 per cent above or below the specified impedance value, and an analysis of the data indicated that a tolerance factor of plus or minus 5 per cent is suitable for all transformers having no special features. The general opinion of the various companies which submitted data was that a tolerance factor of plus or minus 5 per cent was a fair value.

The results of this inquiry were submitted to the manufacturers' representatives on the Transformer and Regulator Group, with the suggestion that a plus or minus 5 per cent tolerance factor be adopted, this factor to apply to all transformers except those (to be definitely designated) having special characteristics. The manufacturers, however, opposed the suggested reduction, on the basis that due to difficulties in predetermining transformer impedance and to manufacturing difficulties, it sometimes happens that transformers manufactured to the same specification have tested impedances which differ by more than 5 per cent. It is the manufacturers' feeling, as expressed by their representatives on the Transformer and Regulator Group, that the troubles experienced by operating companies in paralleling transformers which fall within the present tolerance limits of plus or minus 10 per cent have been so few that the proposed reduction is not warranted. They also point out that the mathematical probability of a transformer 10 per cent above the specified impedance being called upon to operate in parallel with one 10 per cent below the specified impedance is extremely small, but that in general if this should happen the transformer taking more than its share of the load will be able to do so without exceeding the guaranteed temperature rise, and that the total losses under this condition will be about the same as the total losses with the two banks operating independently. Should the actual temperature rise exceed the guaranteed rise, however, they believe that extra radiating surface might be added or cooling coils changed so as to bring the temperature rise within the guaranteed value.

It is felt that while such changes as suggested might be easily taken care of in the case of new transformers, it might be difficult, if not impossible, in some cases, to have the changes made on existing transformers, particularly if they were not of the same manufacture as those with which they are to parallel.

In any event, it would seem that no modifications of any kind should be necessary, for it appears to be a fundamental principle that any type of electrical apparatus, built to definite specifications with accepted tolerance factors, should have the ability to operate in parallel with similar units without exceeding guarantees or subjecting the user to loss of capacity. Moreover, certain companies specify a 5 per cent tolerance and have actually purchased transformers in accordance with such specifications.

In proceeding with this matter, the Transformer and Regulator Group is obtaining specific information from operating companies in regard to difficulties they have experienced in parallel operation of transformers, and discussions with the manufacturers will be continued.

Standards for Accessories

The comment has been made that the N. E. L. A. standards for transformers have not been very rigidly adhered to as regards accessories. However, answers to an inquiry as to the adequacy of the present standards indicate a general sentiment to the effect that the standards are satisfactory. Although several companies suggested modifications desirable from their point of view, there was no general agreement on any of the changes proposed.

It has been suggested that the locations for accessories be standardized. Nearly half of the sixty companies replying to the inquiry believe that locations can be standardized, and several feel that partial standardization can be effected. Several divergent views on proper locations were expressed. Quite a number of companies in stating that locations could be standardized expressed doubt as to whether anything is to be gained by so doing.

Three-Phase Potential Transformers

The opinion is held by some engineers that there is a wide need for three-phase potential transformers, but at the present time because of the comparatively small production, the cost is so high that their use is not justified economically. In response to a question as to whether there would be a demand for three-phase units provided they permitted a substantial saving over single-phase units, the majority of companies stated that they would use the three-phase transformers, although several qualified their statement to the effect that reliability of three-phase units would have to be improved. Nearly half of the companies expressed a preference for single-phase units. A few pointed out that the three-phase unit should cost less than two single-phase units.

This article has been published not only for the purpose of presenting information, but to obtain suggestions and comments. Therefore, it is hoped that anyone desiring to comment upon the subjects included or to offer suggestions regarding future studies will communicate with the Chairman of the Substation Subcommittee.

The date of the Engineering Section Session at the convention has ben changed from Wednesday, June 5, to Tuesday, June 4, at 3 p.m.

Inductive Relations Between Transmission Lines and Toll Lines Under Study by Joint Committee

THE problem of noise in telephone circuits when paralleled by transmission circuits is about as old as the arts of transmission of speech and energy by electricity. Project Committee No. 1* has been actively working on this phase of the physical relations between supply and communication circuits for about four years. Although no reports have been issued based on this work considerable progress has been made toward a solution. Last month an article outlined the work that Project 2 is doing on low frequency induction and this article is intended to show the progress that Project 1 is making on its study of voice frequency induction. It should be remembered that with the growth of both classes of service it is essential that due consideration be given by each to the other in order that neither will be unnecessarily hindered. This can be accomplished only when all the fundamentals of the problem are known and understood by both the interested parties.

Project 1 is assigned this problem which, briefly stated, involves the determination of the magnitudes and sources of noise currents appearing at the toll-circuit terminals of a telephone line, paralleled by a power line for various circuit conditions in both plants.

The problem is being analyzed from three standpoints, namely:

1. Development of improved methods, and accumulation of data, for estimating inductive effects.
2. Development of methods of test for use as practical aids in the field investigation of cases of inductive interference.
3. Development and application of improved preventive and remedial measures.

Special Apparatus Required

It was apparent at the outset that, in order to make any progress in the analysis of the complicated phenomena involved, it would be necessary to proceed on the basis of studying effects at various single frequencies over the range of interest, namely from about 200 to 3000 cycles.

Satisfactory apparatus for the supply of three-phase power at voice frequencies, and for the precise measurement of small currents and voltages through this range were not available, and consequently special equipment had to be designed and constructed. For the supply of three-phase high-frequency power, two generators of special design were constructed, one covering the range 200-800 cycles with a maximum output of 80 kv-a the other covering the range from 800-3200 cycles with a maximum output of 40 kv-a. As a single-phase source of supply, use is made of a standard adjustable-frequency vacuum-tube oscillator and power amplifier. For measuring purposes, selective-circuit amplifier meters were developed. These instruments are of the direct-reading, indicating type. The most sensitive types are capable of measuring as low as 0.05 microamperes and 0.05 millivolts. The selective-circuit feature of these instruments is essential in order to eliminate the effect of extraneous currents normally present on a telephone line, and also to eliminate the effect of any harmonics in the special source of high-frequency power supply.

Test Locations

The committee has engaged in field tests near Cincinnati, Ohio and Terre Haute, Indiana, the latter investigation being still under way. The Cincinnati location involved a 66 kv, three-phase power line and a 20-wire telephone lead at highway separation, with a d-c. trolley system between the two. The exposure length was about 4 miles. Since the total length of the telephone line available was less than 15 miles, tests were largely limited to the measurement of inductive effects within the exposure section.

The Terre Haute location offers a 4-mile exposure between a 33-kv, three-phase power line and a 30-wire telephone lead at a pole-line separation of about 25 feet. The physical situation here is also complicated by the presence of a d-c. trolley system. The illustration herewith shows the exposure section, and also the three test houses which have been provided at the chief measuring point.

The telephone line extended as a 30-wire lead, with some additional circuits over parts of the length, for a distance of 100 miles beyond the exposure section. The availability of this line made it possible to secure a large body of information regarding inductive effects on a long telephone line.

During the major part of the investigation in Terre Haute there have been actively engaged in the field three engineers from the National Electric Light Association and three engineers and a lineman from the American Telephone and Telegraph Company.

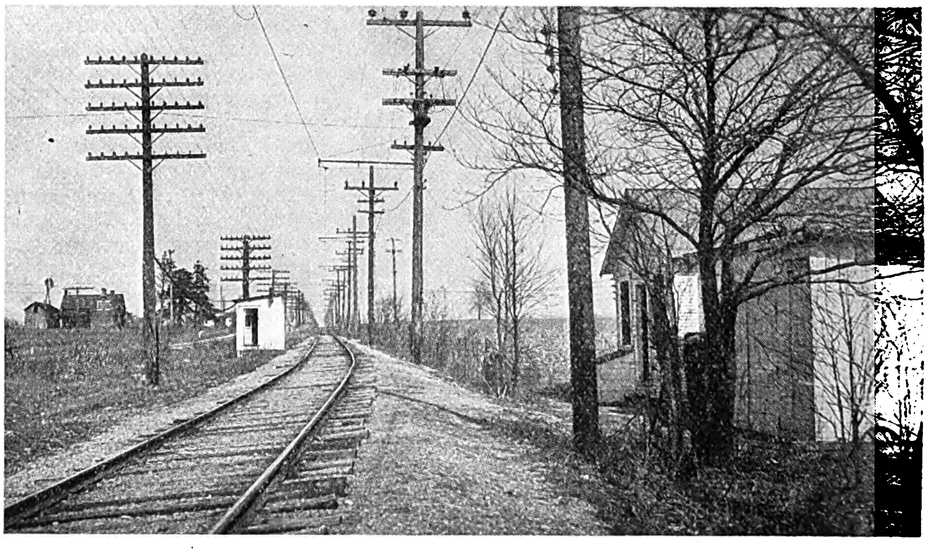
Accomplishments to Date

Three particular lines of endeavor upon which the Project Committee has been making definite progress and which offer promise of early practical value are indicated below:

1. A new method of measuring balance of telephone circuits outside exposure sections.
2. A method of computing the propagation of current and voltage along a telephone lead with ground return.
3. Terminations to be applied at the ends of an isolated section of telephone line to simulate for test purposes, the effect of connecting the section through to a long line.

The first two items have a bearing on the metallic-circuit currents which arise outside of an exposure section. Item 3 concerns the metallic-circuit currents inside the exposure section. The relative importance of these two components depends upon the particular circumstances in any individual case. In the general case each must be considered.

In addition to the specific items mentioned above, the work of the project has resulted in a completion of the major part of the necessary fundamental analysis of its problem. It is probable that upon the termination during the present year of the work in Terre Haute, Indiana, the Project Subcommittee will be in a position to suggest methods of estimating inductive effects for cases of exposure between open-wire toll lines and power lines. The practical application of these methods of computation will require the use of certain empirical factors the magnitudes of which differ considerably in different locations. Some data on these factors are already at hand. In order to secure a representative body of information on their range of magnitude, some further work will be required in situations having quite different physical characteristics.



Exposure Test Section Near Terre Haute, Indiana

The two houses at the right of the track contain the power supply and measuring equipment. The smaller house at the left contains the telephone measuring equipment and special facilities for terminating the telephone line.

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*Project Committee No. 1 of the Joint Subcommittee on Development and Research of Bell Telephone System and N.E.L.A.

Preferred Voltage Ratings for A-C Systems

THE following is abstracted from Mr. A. L. Harding's paper presented at the Annual Meeting of the Engineering Section, Northwest Electric Light and Power Association, Walla Walla, Wash., March 26, 1929. A report of the Joint Committee on Preferred Voltage Ratings of the N. E. L. A. and the N. E. M. A., presenting the same conclusions as those in this article, was approved by the Executive Committee of the Engineering National Section N. E. L. A. at its meeting in Memphis, Tenn., March 12, 1929.

The table on the next page, designated as Table 1, shows the preferred voltage ratings arrived at by the Joint Committee. The following comments apply: The phrase "nominal system voltage" means not the voltage of any particular point in a system but merely a value assigned for the purpose of convenient designation to a system of a given voltage class.

Nominal voltage is more nearly the voltage which will apply at receiving points. Practice in the United States has given recognition to nominal values in even multiples of eleven; for example, 11,000, 33,000 110,000 volts. The Joint Committee work has been concerned to a large degree in selecting those voltages which are really the basic nominal values. The Joint Committee has agreed upon a list of recognized nominal system voltages as shown in the left hand column of Table 1.

In examining the proposed scheme or system of apparatus voltage ratings, it is important at the outset to establish a proper basic viewpoint. What operating companies are most interested in is the standardization of service voltage which must be kept approximately at constant voltage through all ranges of load. The following table shows values that are significant as indicating the trend of American practice in utilization voltages.

SUMMARY OF PRACTICE OF CENTRAL STATIONS AS REGARDS LAMP VOLTAGE
Number of Communities

Lighting Voltage	1923	Per Cent	1928	Per Cent	Change Per Cent
110 volts	6,976	47.7	3,751	19.9	—27.8
115 volts	5,226	35.6	12,879	68.2	+32.6
120 volts	1,197	8.2	2,088	11.2	+ 2.9

The most important apparatus link in the distribution circuit is the distribution transformer. The present cataloged standard distribution transformers in the 2300 volt class are 20:1 ratio 2300 to 115 volts without taps. Under the voltage drop characteristics of a typical distribution system voltage of a supply substation must vary between approximately 2400 and 2670 volts. For this reason the proposed reratings of distribution transformers as shown in columns 4 and 5 of Table 1 and the accompanying comments were adopted. Corresponding dispositions were made in the voltage ratings and transformers for substations and general purpose use and for the transformers and generating stations for supplying high voltage systems as well as for those of reversible tie apparatus; the appropriate columns in Table 1, with the accompanying comments, set forth the range of conditions which these are designed to meet.

As an indication of the attitude of engineers toward this new schedule, member companies of the N. E. L. A. were canvassed recently, and the replies indicate that some 75 per cent are willing to conform to the new schedule, and the majority of the remainder are willing to use the proposed standards at least in part. It should be kept in mind, however, that there will be a certain number of power companies with well established off-standard voltages who may never be able economically to convert to the new schedule. While these companies will thus receive no direct benefit from the proposed standardization, they will on the other hand not be affected adversely and will merely be obliged to continue the purchase of their off-standard voltage ratings as at present. The same condition will apply to systems with extra long transmission distances involving line drops beyond the type of range provided in the proposed transformer rating standards.

Delegates to World Engineering Congress to Sail for Tokio Oct. 11

FORMATION of 90 local committees to aid in recruiting a large delegation of American engineers to attend the forthcoming World Engineering Congress at Tokyo has been announced by Dr. Elmer A. Sperry, chairman of the American committee arranging participation in the event.

The 90 committees will work with the various sub-committees of the American committee to maintain interest between now and Oct. 29, the opening date of the congress. Two thousand feet of new motion-picture film from Japan, showing points of interest for engineers, has been procured.

An international laboratory of world achievements in electrical engineering will be conducted at the engineering congress in Tokyo, and to it electrical engineers of prominence from New York, Philadelphia, Pittsburgh, Atlanta, San Francisco and other American cities will contribute papers sponsored by the American Institute of Electrical Engineers. Farley Osgood, P. M. Downing, W. E. Mitchell and E. C. Stone, for instance, are collaborating on a paper on "Interconnection and Its Effect on Power Development"; "Remote Operating Supervision and Control of Electric Power Stations and Substations" is the subject of a joint paper by Chester Lichtenberg and F. Zogbaum, and other American papers include: "Results of the Operation of Turbo-Generators on a Total-Temperature Rather than a Temperature-Rise Basis," by Philip Torchio; "American Power-Station Electrical Equipment," by F. D. Newbury; "High-Tension Electric Cables," by William A. Del Mar; "Extra-High-Voltage Transmission Lines," by J. P. Jollyman and E. R. Stauffacher, and "Insulation of High-Voltage Overhead Transmission Lines and Insulators," by Arthur O. Austin.

Through Maurice Holland, executive secretary of the American committee, it is announced that the *President Jackson* of the Dollar Line has been reserved exclusively for this country's delegation and will sail from San Francisco on Oct. 11.

Street Lighting

(*Continued from page* 218)

street lighting, including only such underground as was provided for in the company's regular program.

Per Cent of Total Electric Revenue

The revenue received from municipal street lighting represented 6.221 per cent of the total electric revenue of the Public Service Company during 1927. The analysis of the electric revenue is shown in the following table.

Sources of Electric Revenue

Sources	*Revenue*	*Per Cent*
Metered Sales Lighting	$31,621,240.90	61.0427
Metered Sales Power..	16,213,879.03	31.299
Flat Rate Sales-Lighting	22,158.85	0.042
Flat Rate Sales-Power	153.58	0.0003
Railroad Corporations	584,625.27	1.128
Other Electric Corporations	136,649.64	0.267
Municipal Street Lighting	3,223,081.71	6.221
Total	$51,801,788.98	100.00

The increases and percentage increases in street lighting revenue since 1920 are shown in the following table.

Street Lighting Revenue

Year	*Revenue*	*Per Cent Inc. of 1920*
1920.........	$1,553,913.82	....
1921.........	1,660,430.63	6.85
1922.........	1,827,569.65	17.61
1923.........	2,031,455.32	30.73
1924.........	2,283,696.88	46.96
1925.........	2,520,086.62	62.18
1926.........	2,879,286.34	85.29
1927.........	3,223,081.71	107.48

Conclusion

By using these methods the Public Service Company has effected approximately three-quarters of a million dollars increase in revenue during the last two years, proving that street lighting can be sold, and sold profitably. Judging by the number of 60-cp. lamps still in service, there is much in the nature of improvements which still remains to be done. There is no reason to believe that similar increases cannot be attained for several years to come, inasmuch as the territory served is fertile and is growing rapidly.

The future efforts of the company will be toward educating the public to higher intensities of street lighting and to really sell street lighting instead of street lamps.

PREFERRED VOLTAGE RATINGS

Alternating Current Systems and Equipment

Systems (Nominal) See Note (a)	**Lamps and Appliances**	**Motors** See Note (b)	**Transformers for Substations and General Purpose Use** See Note (c) For Distribution Transformers See Note (f). For Rural Service Transformers See Notes (g) and (i). For Potential Transformers See Note (e)		**Transformers at Generating Stations for Supplying High Voltage Systems** See Note (c)		**Transformers for Reversible Tie Purposes**		**General Apparatus** See Note (j)	**Generators** See Note (k)
			Primary See Note (d)	**Secondary** See Note (e)	**Primary** See Note (d)	**Secondary**	**Primary** See Note (d)	**Secondary**		
115	110 **115** 120	110	......	115	......	......	......	......	......	120
220	......	220	220	230	220	......	230	230	......	240
440	......	440	440	460	440	......	460	460	......	480
550	......	550	550	575	550	......	575	575	2,500	600
2,300	......	2,200	2,300	2,300(h)	2,300	2,400	2,400	2,400	......	2,400(l)
4,000	......	3,800	4,000	4,000(h)	4,000	4,150	4,150	4,150	4,500	4,150(l)
4,600	......	......	4,600	4,600(h)	4,600	4,800	4,800	4,800	......	......
6,600	......	6;600	6,600	6,900(i)	6,600	6,900	6,900	6,900	7,500	6,900
11,000	......	11,000	11,000	11,500(i)	11,000	11,500	11,500	11,500	......	11,500
13,200	......	13,200	13,200	13,800	13,200	13,800	13,800	13,800	15,000	13,800
22,000	......	......	22,000	23,000	22,000	23,000	23,000	23,000	23,000	23,000
33,000	......	......	33,000	34,500	......	34,500	34,500	34,500	34,500	......
44,000	......	......	44,000	46,000	......	46,000	46,000	46,000	46,000	......
66,000	......	......	66,000	69,000	......	69,000	69,000	69,000	69,000	......
110,000	......	......	110,000	115,000	......	115,000	115,000	115,000	115,000	......
132,000	......	......	132,000	138,000	......	138,000	138,000	138,000	138,000	......
154,000	......	......	154,000	161,000	......	161,000	161,000	161,000	161,000	......
220,000	......	......	220,000	230,000	......	230,000	230,000	230,000	230,000	......
330,000	......	......	330,000	345,000	......	345,000	345,000	345,000	345,000	......
			Equivalent of two (2) 5% full capacity taps below on primary to compensate for line regulation.		Equivalent of one (1) 2½% full capacity tap above and two (2) 2½% full capacity taps below on secondary to compensate for transformer regulation.		Equivalent of three (3) 5% full capacity taps below on both primary and secondary.			

NOTES

(*a*) Nominal voltage is a nominal value assigned for the purpose of convenient designation to a circuit or system of a given voltage class. Figures underlined indicate suggested trend of future practice.

(*b*) All motors are suitable for delivering rated hp. at rated frequency throughout a range of 10 per cent below to 10 per cent above rated voltage.

(*c*) Where a transformer is located remote from a generating station and is required to supply a system of another voltage (either lower or higher), the voltage ratings of transformers for substations and general purpose use are suitable.

(*d*) For all transformers, voltage ratings are no load, or turn ratios.

The primary winding is that winding which receives energy from the supply circuit.

Transformer excitation is normal when the voltage impressed on primary terminals under full rated load is sufficient to overcome regulation and obtain rated voltage on secondary terminals.

Transformers are suitable for delivering full-rated kva. output throughout a range of 5 per cent below to 5 per cent above rated voltage.

(*e*) Potential transformers are rated on primary the same as substation and general purpose transformer secondaries, and have approximate 115-volt rating on secondary. In the case of 2300 or 4600-volt nominal potential transformers for use on substation or station buses, feeding distribution systems or networks, a rating of 2500/4300 Y — 125 or 5000-125 is provided.

(*f*) Distribution transformers for 2300/4000 Y, or 4600 or 7620/13200 Y, or 13200-volt nominal distribution systems or networks using 110, 115 or 120-volt lamps are rated:

2300/ 4000 Y — 115/230 2400/ 4150 Y — 120/240 2500/ 4300 Y — 125/250	This transformer has no taps.
2300/ 4600 — 115/230 2400/ 4800 — 120/240 2500/ 5000 — 125/250	This transformer has no taps.

(*f*) C't'd

7620/13200 Y — 120/240 or 13200 — 120/240	These transformers have two (2) 5 per cent full-capacity taps on primary and are suitable for over-excitation, delivering a secondary voltage of 125/250 volts for use with 120-volt lamps.

(*g*) The preferred voltage rating for future practice for rural service is 7620/13200-volt nominal. Distribution transformers (note *f*) are suitable.

Rural service transformers for 6600/11430 Y or 11000-volt nominal rural service lines using 110 and 115-volt lamps are rated: 6900/11950 Y — 115/230. This transformer has three (3) 5 per cent full-capacity taps on primary.

(*h*) Substation transformers supplying 2300/4000 Y nominal distribution systems or networks using 110, 115 or 120-volt lamps are rated 2500/4300 Y secondary, with two (2) 5 per cent full-capacity taps and one (1) 5 per cent reduced capacity tap on primary (two to compensate for line regulation and one to obtain a ratio permitting operation at 2600/4500 Y for use with 120-volt lamps).

Substation transformers supplying 4600-volt nominal distribution systems or networks using 110, 115 or 120-volt lamps are rated 5000-volt secondary, with two (2) 5 per cent full-capacity taps and one (1) 5 per cent reduced capacity tap on primary (two to compensate for line regulation and one to obtain a ratio permitting operation at 5200 volts for use with 120-volt lamps).

(*i*) Substation transformers supplying 6600/11430 Y or 11000-volt nominal rural service lines using 110 or 115-volt lamps are rated 7200/12470 Y volts secondary, with two (2) 5 per cent full capacity taps on primary.

(*j*) All general apparatus has a tolerance of 5 per cent above rated voltage, except ratings 15000 volts and below, which are maximum.

(*k*) Generators are suitable for delivering full rated kva. output at rated power factor and frequency throughout a range of 5 per cent below to 5 per cent above rated voltage.

(*l*) Generators directly connected to buses serving nominal 2300 or 4000-volt distribution systems or networks are rated 2500 or 4300 volts.

Table 1

Spring Group Meeting Engineering National Section

THE Spring group meeting of the Engineering National Section, held in Memphis, Tenn., March 11 to 14, 1929, was well attended and very successful. The wisdom of the practice of holding these group meetings in different sections of the country was well justified by the presence of members of the section's committees from the South and Southwest, many of whom have not been seen at these meetings often enough.

A new order for the program, whereby the parallel sessions of committees were arranged so that those interested in the proceedings of somewhat similar committees could cover both, proved to be advantageous to members who have to travel great distances and who are, therefore, anxious to cover as many activities as possible.

The meeting has a good record of accomplishment. The report of the Joint Committee on Preferred Voltage Ratings was approved, and the N. E. L. A. members of the Joint Committee were empowered to continue their work for the purpose of adjusting those details that have not been finally settled.

Upon recommendation of the Accident Prevention Committee, the pamphlet "Common Sense" was approved by the Section Executive Committee. This pamphlet contains certain simple precautions and is recommended for distribution by companies to their customers.

The Electrical Apparatus Committee recommended approval of the proposal to include provisions for operating conditions in the Standards of the American Institute of Electrical Engineers relating to electrical machinery and equipment. The Section Executive Committee concurred in this recommendation.

The local arrangements for the meeting were admirable, and the Section acknowledged its debt to the Memphis Power and Light Company, the local committee under the chairmanship of Mark Eldredge, and to the Hotel Peabody. More detailed information from the various committees of the Engineering Section will appear in a later issue.

Memphis Meeting Accident Prevention Committee

By C. R. BEARDSLEY, *Chairman*

A WELL attended meeting of the Accident Prevention Committee was held at Memphis on March 12-13 in conjunction with the group meeting of the Engineering National Section.

For the past five years the annual statistics of fatality rates among employees show a wide spread. One Geographic Division reports a rate per 1000 employees nine times as great as that of other divisions. This is merely a symptom of the real disease, which may be partly described as follows: *Failure*

I. *Of Management* to inaugurate safety work.
II. *Of Officials* personally to take interest.
III. *Of Designers* to incorporate safety measures.
IV. *Of Superintendents* to adopt safe practices.

We cannot expect employees to become "safety-conscious" and continuously watchful, unless this work is inaugurated and continuously followed up as a regular program.

The Accident Prevention Committee devoted much thought and discussion to increasing its own effectiveness in relation to Divisional activities. One member remarked that "scads and scads" of really valuable reports, recording experience and practices proved to be effective in use, exist at N. E. L. A. Headquarters and in the highly polished bookcases in executive offices and company libraries, but do not reach the designers, foremen and others for whom they were prepared. This is the fault of those to whom the sample copies are sent. There is evidently a failure of appreciate potential values, and to secure complete distributions of reports and the adoption of the measures recommended.

The Geographic Division Accident Prevention Chairmen are responsible for correcting any such lethargy in their divisions. One report stated that about one-half the Divisions are active and effective. Five Divisions failed to report any activity whatever.

On the brighter side it was noted at Memphis that other engineering committees are taking increasing interest and are initiating studies of hazards peculiar to their work. This is fine and very encouraging to the Accident Prevention Committee.

The Accident Prevention Committee has increased the number of its members who are actively engaged in management, construction or operation in the field. Some of these members are representing Accident Prevention on the other committees. This type of member is of much potential value to both the committees for which he acts as liaison officer.

The practical viewpoints of these men have brought to light several hazards in need of study and correction. Six serial reports are scheduled in June together with other pamphlets and articles. Among these are to be "Automobile Accident Analysis," "Construction Safe Practices" (embodying hydro-electric and other branches not covered in No. 278-44), "Training Employees for Safety," "High Voltage Testing," "Catalog and Bibliography of Safety Devices and Methods" and "Statistics and Analyses." Other Serial Reports are under preparation but will hold over.

The Low Voltage Hazards Sub-committee has contributed many valuable precautions which have been incorporated in the "More Power to the Home" series. The Executive Committee of Engineering National Section has adopted for publication an envelope stuffer entitled "Common Sense" which will be published at an early date. This is designed to educate the public to avoid creating hazards in the home by use of worn out appliance cords and defective or sub-standard appliances.

The Executive Committee confirmed appointment of Wills MacLachlan, E. W. Gorry and C. R. Beardsley (ex. off.) to act with a similarly appointed committee of the American Gas Association in a revision of the Resuscitation Pamphlet No. 278-57.

Action of Insull Medal Awards Subcommittee on eighteen applications for the medal was ratified. This list is published elsewhere in this issue in the report of the Executive Committee meeting recently held in New York.

Discussion aimed at more intimate relations and cooperation with Public Utilities Section of National Safety Council were fruitful.

Other reports of satisfactory progress were read on Codes, Rubber Gloves, Hot Line Tools and Unusual Accidents.

Power Systems Engineering Committee Meeting

Engineering Plan of Systems

AT the mid-winter Cleveland meeting of the Power Systems Engineering Committee several utility executives gave talks on the broad aspects of system planning and system development. This program was followed at the Memphis meeting on March 11 and 12 with the presentation of the engineering plans of two metropolitan and two transmission systems. The engineering reasons for the system layout were given and each system was then discussed by the 75 men present at the meetings.

The Detroit Edison system engineering was presented by S. M. Dean, the Brooklyn Edison Company plan by J. A. Fairman, the American Gas and Electric Company plan by Philip Sporn and the Oklahoma Gas and Electric plan by F. J. Meyer. The distinguishing feature of the Detroit plan was the use of self-sustaining power areas each connected to other areas for emergency conditions. In the Brooklyn system a secondary network plan of distribution is being installed rapidly. The American Gas and Electric Company system consists of a narrow service area extending from near Chicago into Virginia with interconnected 132 kv. lines and several generating stations. The Oklahoma Gas and Electric system is based on a 66 kv. transmission system and several generating stations and rapidly developing oil field loads have made planning very difficult.

In a general discussion of engineering system planning the conclusion was reached that load density, load concentration and the space factor between loads were the deciding elements in system layout. No generalized expressions could be stated in a quantitative way because of the rapid changes in the art and in load conditions. Limitations in apparatus, the allowable energy concentration at any point, reliability of service, voltage regulation and system stability were presented as modifying factors to be used in the layout of any system. No positive conclusions could be had as to quantitative data on any of the elements discussed and further work of the committee will deal with more detailed analysis of some of the basic system engineering problems.

Metermen's Meeting at Cincinnati

TWO hundred meter executives of utilities throughout the Middle West attended a meeting at Cincinnati, Feb. 13 and 14, of the meter conference of the East Central Division, N. E. L. A. M. F. Smalley, Canton, Ohio, presided, and C. S. MacCalla, Youngstown, president of the division, described advances in the past year in meter practice. William Shuler, Dayton, chairman of the Engineering Section, discussed technical improvements; J. R. West, Akron, explained methods to make the largest number of tests a day consistent with accuracy; H. E. Buck, Canton, described the proper application of meters to connected load, and O. K. Coleman, American Gas & Electric Co., New York, spoke on "Instruments of Transmission and Their Proper Application."

Engineers to Study Farmer's Problem

A NATION-WIDE study of the agricultural industries, similar to the survey made by the Hoover Committee on Waste in Industry, is planned by the American Engineering Council. The survey will probably take five years to complete. The council hopes to undertake the survey in cooperation with the American Society of Agricultural Engineers, according to an announcement made by Lawrence W. Wallace, executive secretary of the council.

"We hope to initiate and prosecute a study which will encompass the economic, social, financial and engineering phases of agriculture," said Mr. Wallace, who was vice-chairman of the waste committee. He said that it was the conviction of engineers that such an analysis would lead to a fundamental and economic improvement in agriculture. He said the object of the study would be "to direct the attention, through methods of engineering analysis, to the hindrances of agricultural development and well-being and to suggest specific means of removing them on the basis of good agricultural practice and sound engineering thought."

A 1929 National Electrical Code Assured

AT its meeting of Feb. 18 and 19 the Electrical Committee of the National Fire Protection Association, which formulates the National Electrical Code, voted to bring out a 1929 revision of the Code. This revision will contain substantially the grounding rules of the 1925 Edition of the Code with such changes as may be necessary to bring these rules into suitable conformity with the other parts of the 1928 revision.

This action has met with general acceptance and it appears certain that this 1929 revision of the Code will receive the approval of the National Fire Protection Association and will be approved as an American Standard by the American Standards Association at an early date. In view of the forthcoming 1929 Code, it is believed that most enforcing authorities will not apply the objectionable grounding requirements of the 1928 revision pending the promulgation of the 1929 revision.

With the continuance of the 1925 grounding rules it follows that a more protracted and careful study of grounding requirements will be undertaken and the N. E. L. A. plans to proceed without break in its constructive program of collecting information which will furnish a better basis for the formulation of code requirements.

COMMERCIAL SECTION

MARSHALL E. SAMPSELL, *Chairman* C. E. GREENWOOD, *Commercial Director, N. E. L. A.*

National Industrial Heating School

AN Industrial Heating School, conducted under the auspices of the Industrial Heating Committee, Commercial National Section, with the assistance of the National Electrical Manufacturers Association, will be held at Cleveland, Ohio, starting May 14. The classroom sessions in Cleveland will be held at the Case School of Applied Science. The school will continue in Cleveland until May 21. On May 22 the school will be transferred to Detroit, Mich., and will be held there until May 24.

Inspection trips, which will alternate with classroom work, will be taken in Cleveland and vicinity, and Detroit.

The method of conducting the school this year is a radical departure from that of previous years. The lecturers will be men prominent in the industrial heating field drawn from the equipment manufacturers users of equipment, and central stations.

The following subjects will be covered:

The History and Development of Industrial Electric Heating.
The Market for Industrial Electric Heating.
Industrial Heating Surveys.
Electric Heating Elements in Industrial Heating.
Electric Heating Problems and Calculations.
The Application of Low-Temperature Heating Units.
Soft Metal Melting.
Industrial Ovens.
Fundamentals of Heat Treating.
Heat Treating (Below 1800 degrees).
Application of Electric Lead and Salt Bath Furnaces.
Electric Heat Treating (Above 1800 Degrees).
Vitreous Enameling.
Melting Brass.
Melting Steel.
Melting Gray Iron.
High Frequency Electric Heating Applications.
Application of Temperature Control Instruments.
Competitive Fuels.
Arc Welding.
Economics of Industrial Heating Practice.
Effective Sales Promotion.
Talks by Prominent Users of Electric Heating Equipment.

There is a registration fee of $5 which includes a copy of Wilcox's "Electric Heating." Upon enrollment in the school, a copy of this book will be mailed to each student. He is expected to study the first four chapters, covering the fundamentals of electric heating, before entering the school.

Central stations interested in load building are urged to send one or more of their best power engineers.

Enrollment and information blanks have been mailed from National Electric Light Association headquarters.

The enrollment blank should be filled out as soon as possible and mailed to J. L. Faden, Chairman, Industrial Heating Committee, 39 Boylston Street, Boston, Mass. The closing date for enrollment is May 1.

North Central Commercial Meeting

WITH the problems of introducing and selling modern electric appliances to the public as their convention theme, two hundred members of the Commercial Division of the North Central Electric Association discussed merchandising methods at a two-day session at Minneapolis on Feb. 25 and 26. C. J. Strike, vice-president of the Northwestern Public Service Company, was chairman. Kenneth McIntyre of the Society for Electrical Development and Miss Eloise Davidson of the N. E. L. A. home economics department spoke at the first session, followed by C. E. Greenwood, commercial director N. E. L. A.

H. E. Young, Northern States Power Company, said that a feature of merchandising electric refrigerators had been the manner in which manufacturers themselves had developed the market. The power companies have done most of the pioneering, he said. "Twenty-five per cent of lost sales are due to the indifference of the salespeople," Walter S. Byrne, vice-president of the Kilpatrick Company, Omaha, Neb., and former sales manager of the Nebraska Power Company, declared, speaking on "Merchandising Pitfalls."

"How to Sell Better Home Lighting" was discussed by H. E. Rademacker, Edison Lamp Works, Chicago, and Ell Bennett talked of new developments and practices in the sale of electric refrigeration. L. M. Pharis of Duluth, president of the association, spoke at the dinner-dance on Monday evening.

Tuesday's program included practical talks by H. E. Kahlert, Northern States Power Company, and Val Thorsen of St. Paul. T. T. Parker, president Northwestern Public Service Company, Huron, S. D., spoke on merchandising policies at a luncheon meeting. "Capitalizing Customer Contacts," by W. S. Heald, Minnesota Light & Power Company; "The Oil-Burner Load," by A. K. Baylor, General Electric Company, and "Utilizing a Salesman's Time Properly," by J. D. Broome, A B C Manufacturing Company, Peoria, Ill., were other papers, followed by discussions.

Northwest Commercial Section Conference

At the fourth annual mid-winter conference of the Commercial Section of the Northwest Electric Light and Power Association held at Spokane, Wash., Feb. 28 and March 1-2, talks by Chairman Lewis A. Lewis, J. E. E. Royer and M. L. Hibbard stressed the necessity for intensive commercial effort. Outside viewpoints on farm electrification were expressed by Dr. E. C. Holland, president Washington State College, and Fred W. Clemens, *Washington-Oregon-Idaho Farmer*.

Power Bureau meetings heard reports from the commercial cooking, industrial heating and power committees, presented respectively by C. J. Anderson, Carl Hoffman and E. E. Scofield. Mr. Scofield said that the maximum rate at which electric power could compete with Diesel engines in North Pacific Coast territory was 1½ cents per kilowatt-hour.

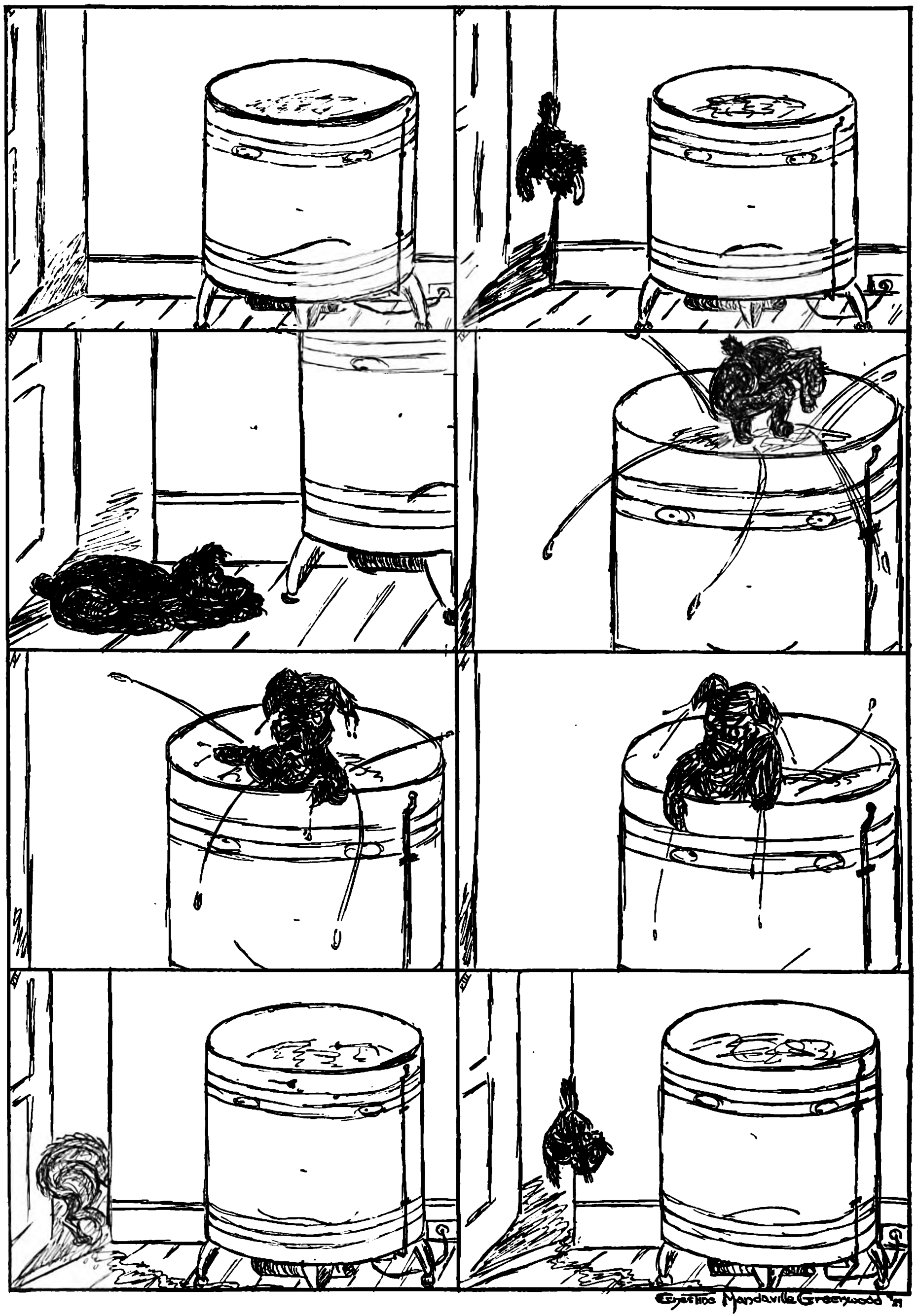
For the Merchandising Bureau, G. A. Kumler reported for the domestic range committee, Glenn L. Jackson for the domestic refrigeration committee and J. W. Wisdom, Jr., for the water-heating committee. All these reports brought out useful and up-to-the-minute facts on their respective subjects. The major portion of the report of the general merchandising committee, presented by H. W. Cooper, dealt with the question of sales organization.

Defining a promotional rate as one designed to induce the customer to use to a maximum the facilities required to serve him, the conclusion of the promotional rate committee, for which Thomas M. Gibbes reported, was that the greatest effect on increasing consumption and revenue was derived from a reduction in the price of the second step, with the greatest differential between the first and second steps; that the next effective influence was derived from a decrease in the sum produced by the first step, and that lowering the price of the first step had the least influence. Discussion called attention to the alleged bad psychology of the readiness-to-serve charge.

Lighting Bureau reports were from the electrical advertising committee; by T. W. Fitch; the home educational committee, by Fred Zaugg; the commercial and industrial lighting committee, by L. B. Gowan, and the street and highway lighting committee, by George M. Boyd.

The program of the rural electrification committee, with J. C. Scott as chairman, took the form of a symposium on how farm load could and should be developed. Selling to the farmer, cooperation with dealers, equipment and demonstration, farm specialists and organization of a rural department and advertising and literature were topics treated separately in a prepared symposium. One session was devoted to the subject, "Developing an Appreciation of the Value of Electric Service on the Farm" from different viewpoints, that of the power company being presented by A. C. McMicken.

THE ELECTRICAL ADVENTURES OF NAPOLEON II



After Some Personal Research He Reaches Certain Definite Conclusions as to the Efficiency of the Electric Washing Machine

PUBLIC RELATIONS SECTION

J. F. Owens, *Chairman* George F. Oxley, *Director, Department of Public Information, N. E. L. A.*

Public Relations National Section Executive Committee Meeting

Strengthening of voluntary cooperative activities between the electric light and power industry and the higher educational institutions of the country under authoritative guiding principles to be declared by educational administrators of national standing and experience was urged upon the industry by the executive committee of the Public Relations National Section at its third meeting of the administrative year held at N. E. L. A. Headquarters, March 6. The executive committee of the Section received, discussed and approved a statement and recommendations regarding these cooperative activities, as submitted by the public utility members of the Committee on Cooperation with Educational Institutions. At the meeting of the National Executive Committee at Headquarters, March 7, official ratification was given to the statement and recommendations.

The meeting of the Public Relations Executive Committee was one of the best attended of the year, there being 48 persons present, representing all but one Geographic Division. The meeting was called to order at 11 o'clock by Chairman Owens, who read a telegram from President Arkwright expressing regret because of his inability to be present. Headquarters' activities were outlined by Managing Director Paul S. Clapp.

Marshall E. Sampsell, Chairman of the Commercial National Section and E. C. Stone, Chairman of the Engineering National Section were present and briefly outlined the activities of their sections, calling particular attention to the manner in which the work of the several sections is being coordinated.

Cooperation with Educational Institutions

Chairman Carl D. Jackson of the Cooperation with Educational Institutions Committee reported completion of the survey conducted by Dean C. O. Ruggles and stated that the report was to be considered and finally passed upon by the educator members of the committee without reference to the utility members of the committee. He then read the following statement and recommendations, prepared and adopted at a meeting of the utility members of his committee at Headquarters, March 4 and 5:

> "This committee has considered the general situation in respect to cooperation by the industry with the higher educational institutions. In our opinion it has been clearly demonstrated that this cooperation is not only of mutual benefit but that it serves the public interest and should be continued and further developed.
>
> "There are, however, certain essential facts which we believe worthy of the most serious consideration. During the last year, this industry has been subjected to criticism in relation to some of the cooperative activities, and there exists in some quarters a misinterpretation of our motives and the opinion that there has not always been shown a complete appreciation of the high ethical standards which must at all times prevail in such activities. This Committee is convinced that modification of our present organization would reasonably provide in the future against any occasion for adverse criticism of cooperative relationships and further strengthen the field of useful cooperation.
>
> "The actual functions of cooperation have been generally exercised by organizations neither directly related to, nor cooperating with, this committee. The committee has lacked such contacts with State or local cooperative agencies as are essential for the formation and promulgation of national policies.
>
> "We recognize the fact that cooperation cannot be exercised efficiently or in the public interest merely through a centralized committee out of touch and inadequately acquainted with local conditions, demands or sentiments. Our organization rests upon a basis of voluntary cooperation as its mainspring. The major responsibility must remain local and any attempt at centralized control would be ineffective. A survey of the entire situation leads us to the following conclusions:
>
> "First: That it is desirable that there should be established in an authoritative way guiding principles to control future cooperative activities, such principles being in general those which should prevail between educational institutions on the one hand and electric light and power companies on the other hand. It is our belief that such principles can be best declared in an authoritative way by educational administrators of national standing and experience. We recommend to our Association the furtherance and encouragement of such measures as may be best fitted to secure such declaration of principles.
>
> "Secondly: We recommend more efficient cooperation within our organization to assure sound development of relations with educational institutions, free from legitimate criticism, and such as to sustain with the educators that confidence in our activities and purposes that must at all times prevail if the best interests of the public and all concerned are to be served. We believe that the following plan will lead to this result without trespassing on the full measure of local responsibility in such activities and we recommend that steps be taken to put the plan in effect in the immediate future.
>
> "We recommend that each geographic representative of this committee take up with leading executives in each State within his division the initiation of such steps by the utility executives in connection with administrative heads of educational institutions as will bring about in each State the selection of an industry representative satisfactory to the educational institutions to whom in each State there shall be referred for approval all proposed cooperative activities.
>
> "We further recommend that such representatives be requested to act as the State representatives on the geographic division committee of this committee.
>
> "The above statement and recommendations are hereby adopted by the utility members of the Committee on Cooperation with Educational Institutions, and we respectfully refer the same to the Executive Committee of the Public Relations National Section for its approval and such further action in connection therewith as it shall deem advisable."

Customer Ownership

Interest in customer ownership throughout the country is low at present according to Chairman W. H. Hodge of the Customer Ownership Committee because present financial conditions have made other methods of financing preferable.

Chairman Hodge called attention to the lack of cooperation being given to the National Better Business Bureau by the electrical industry and submitted to the executive committee of the section the following recommendations, which were approved and referred to the National Executive Committee:

> "The Chairman of the Customer Ownership Committee respectfully calls the attention of the Public Relations Section to the fact that response of member companies to the recommendation of the Customer Ownership Committee that financial support be accorded to the National Better Business Bureau has been very poor. Total contributions since October, 1928, amount to only $900. Attention is further directed to the importance of protecting utility stockholders through the National Better Business Bureau, and also to the desirability of utilizing the services of that Bureau toward preventing abuse of customer ownership principles by irresponsible companies and persons controlling a limited number of utility properties.
>
> "The Chairman therefore recommends that the foregoing be brought before the executive committee of the National Electric Light Association with the request that the executive committee take suitable action to urge member companies, and particularly holding companies of a national or semi-national character, to extend a suitable measure of financial support to the National Better Business Bureau."

On behalf of the Industrial Relations Committee it was reported that two serial reports have been prepared on "Training for Better Public Contact—Analysis of Public Contact Work" and "Health and Medical Instruction."

Public Speaking

Chairman W. S. Vivian of the Public Speaking Committee reported that public speaking activities in all parts of the country show an increase over those of previous years. He announced that the statistical chapter of the N. E. L. A. Handbook is being revised and will be made available for substitution in place of the old chapter prior to the convention. He reported that his committee has recommended a national speaking contest, details of which are to be evolved, and the executive committee approved the idea.

Women's Committee

Reporting for the Women's Committee, Miss Sophia Malicki, Chairman, stated that the program outline has been carried on energetically. The program includes economics of utilities with a special emphasis on rates and regulation, the importance of proper employee attitude toward the public and acquaintance with utility equipment in the home. She called attention to three short courses for utility women being conducted at universities in the Middle West. Chairman Malicki urged that more attention be given by the industry to the question of home service, emphasizing the importance of companies having home service departments.

Activities of the Department of Public Information were outlined by George F. Oxley, Director.

Details of the convention program were presented by Managing Director Paul S. Clapp. This information will be found elsewhere in this issue of the Bulletin.

Reports presented by the Geographic Division representatives indicate that the work of the section has been carried on aggressively throughout the year.

GEOGRAPHIC DIVISIONS and STATE ASSOCIATIONS

Southeastern Division Committees Meet

CONFERENCES of various committees of the Southeastern Geographic Division were held at Jacksonville, Fla., Feb. 12-14. The Meter Committee meeting took place on the 12th, and proved to be the largest attended meeting of this committee held during the current year and one of the most interesting and instructive, according to E. A. Corum, Memphis Power and Light Company, chairman of the meter committee.

The balance of the committee meetings were held on the 14th, the day following the rural service conference, which is discussed elsewwhere in this issue. Included in the committees were the Executive, and those of the Accounting, Commercial, Engineering and Public Relations sections.

Individual committee meetings got under way promptly at 9.30. In addition to the committees named above, the Meter Committee held a meeting on the morning of the 14th and wound up unfinished business and discussed various metering problems.

The Accounting Section met in two divisions, the Customers' Records Committee and the Purchasing and Storeroom Committee. C. J. Curry, Carolina Power and Light Co., is chairman of the Accounting Section, and C. A. Raymond, Tampa Electric Company, chairman of the Customers' Records Committee, and Thomas Bartlett, Florida Power Corporation, chairman of the Purchasing and Storeroom Committee.

The Public Relations Section met with J. P. Dick, Georgia Power Company, chairman, in two sections; the Women's Committee under the leadership of Mrs. Jane Pratt, Alabama Power Company, and the Customer-Employees Relations Committee under the chairmanship of F. R. Mitchell, of the Alabama Power Company.

The largest attendance was in the Engineering section meetings, and credit is due H. J. Scholz, of the Alabama Power Company, chairman of the Engineering Section, for the interest displayed in the engineering activities of the Southeastern Division.

The six engineering committees meeting included the Accident Prevention; Overhead-Underground Systems; Inductive Coordination; Electrical Apparatus; Prime Movers and Meter Committees.

The Accident Prevention Committee, R. B. Grove, Florida Power and Light Company, chairman, discussed the revision of rules governing accident prevention contests at some length. Another discussion centered around safety rallies and the benefits from such activities. The subject of rubber protective devices came in for considerable discussion, including testing of equipment and the best means of testing and discarding gloves. There was also a discussion on the use and care of portable fire extinguishers.

The Inductive Coordination Committee, under the chairmanship of H. L. Wills, Georgia Power Company, discussed a number of pertinent subjects, including neutral grounding through current limiting devices; the necessity for using and caring for rubber gloves; railroad and wire crossings and the ventilation of transformer vaults.

The Electrical Apparatus Committee, under the chairmanship of E. E. George, Tennessee Electric Power Company, has been particularly active during the past year. At the Jacksonville meeting the committee discussed at some length the methods of calculating ground currents; the staging of system tests; measuring ground resistance; automatic frequency control; substation control and ending with a general discussion of codes and standards.

The Prime Movers Committee, J. H. White, Florida Power and Light Company, chairman, took up a variety of subjects for discussion. The operation and maintenance of turbines and condensors was the first problem, followed by discussion on the care of standby stations and plants; station instruments; feed water treatment as studied by the Southeastern Division, N. E. L. A.; governors for hydraulic turbines; the influence of a knowledge of water consumption and the possession of accurate water rate curves on station economy of hydro plants; automatic hydroelectric plants; methods of conducting dam and gate leakage investigations. These discussions were followed by papers on air preheaters and on steam flow forecasting in the Southeast.

The Commercial Section also drew a good attendance, and there were many interesting discussions in the various committee meetings. Charles Preston, Florida Power and Light Company, is chairman of the Commercial Section.

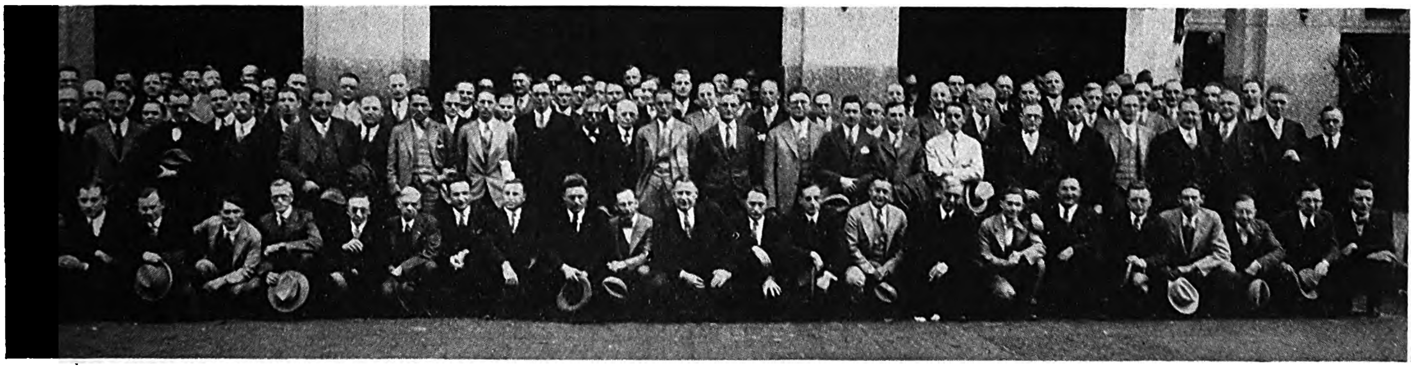
The Merchandising Policies Committee, Lee Goodwin, Durham Public Service Company, chairman, discussed the participation in prize contests; using employees as salesmen during campaigns; trade relations with other organizations selling electrical goods; practices employed in selling radio sets and equipment. There was considerable discussion on the sales of sub-standard equipment, with the general opinion expressed that the power companies cannot afford to handle anything but quality merchandise.

The Farm Equipment Committee met with E. E. Ensor, Gulf Power Company, chairman, and discussed the many items which are offered for sale to the farm customers.

The Water Heating Committee, W. H. McInnis, Columbus Electric and Power Company, chairman, had an excellent report on the progress made in surveying the water heating possibilities.

The Refrigeration Committee, W. B. Harris, Knoville Power and Light Company, chairman, had several good reports.

There was considerable interest shown in the Lighting Committee, led by B. H. Martin, Tennessee Electric Power Company.



Group of Delegates to Southeastern Division Committees Meeting

Joint Convention of Illinois Associations

A JOINT convention of the Illinois State Electric, the Illinois Electric Railways, and the Illinois Gas Associations was held at Springfield, March 14-15. Approximately 900 delegates were in attendance. Eight addresses were given before joint morning meetings, and six papers were read before the Illinois State Electric Association at the separate afternoon sessions of that division. The women's committee had, besides, a session of its own.

Governor Louis L. Emmerson, who addressed a joint meeting Friday morning, reaffirmed his faith in the State's system of utility regulation, saying:

"I believe the powers vested in the Illinois Commerce Commission under present laws are sufficient to insure intelligent regulation. It will be the policy of my administration to insist that these laws are administered by the commission in a manner which will result in the greatest benefit to the public and the fairest and most intelligent treatment of the utilities. I regard this commission as a court which should be composed of men of the highest integrity, and, being so constituted, it should function without executive suggestion or interference.

"Public ownership," the Governor went on, "is coming rapidly, but it is coming in the form of customer ownership and employee ownership. As the average man becomes more familiar with the investments in securities in corporations, and as the ultilities see more clearly the value of customer ownership, I am convinced the day approaches when most of your stockholders will be the people who use your service."

A second speaker on the Friday morning program, James D. Cunningham, president of the Illinois Manufacturers' Association and head of the Republic Flow Meters Company, Chicago, saw the solution of the farm problem in the increasing number of factories in small towns. The expense of maintaining plants in congested metropolitan districts is driving manufacturers to seek sites in smaller communities, and the availability of power in these communities will bring many industries from the city to the small town, he said.

The importance to the utility company of accurate statistics and all-inclusive data was stressed by Alexander Forward, secretary-treasurer of the American Gas Association. Exact figures on housing conditions in Chicago were given by E. V. Stevens, assistant statistician of the Commonwealth Edison Company, in an address on "Effective Use of Statistics," which was given before the electric group Friday. Vigorous sales campaigns were advocated by F. P. Cope, Allied Power & Light Corporation, Jackson, Mich., and by W. S. Vivian, Middle West Utilities Company, Chicago.

Mercury-arc rectifiers, in use by the Chicago & Joliet Electric Railways Company, have proved satisfactory, A. W. Baumgarten, division engineer of the road, reported. A rectifier at Lemont substation effected an estimated annual saving of $9,576, he said. A complete set of construction standards for rural electric lines was presented by J. D. Roberts, chief engineer Central Illinois Public Service Company, Springfield.

Others on the program were Tom C. Polk, secretary, Great Lakes Division, N. E. L. A.; J. F. Blackburn, Rockford Gas & Electric Company; S. E. Doane, General Electric Company; S. L. Hilyard, Illinois Power & Light Corporation; J. R. Pershall, Public Service Company of Northern Illinois; H. A. Kleinman, Moline; A. G. Ford, Aurora; Donald M. Mackie, Jackson, Mich., and Miss Isabell Davie, N. E. L. A. headquarters.

Officers of the Illinois State Electric Association chosen for 1930 were: President, E. F. Kelly, Central Illinois Public Service Company, Springfield; vice-president, Oliver Hogue, Commonwealth Edison Company. G. W. Schwaner, Springfield, was reelected secretary-treasurer of the three bodies.

Oklahoma Utilities Association Convention

MORE than 1000 delegates attended the eleventh annual convention of the Oklahoma Utilities Association, held March 12-14 at Oklahoma City. Approximately 600 utility men and their guests attended the annual banquet and entertainment Wednesday night. Col. Oscar H. Fogg, New York, president American Gas Association, was the principal speaker. Referring to the Federal Trade Commission's investigation of public utilities, Colonel Fogg said that he believed a careful examination of the records to date would show that, "except for occasional detached instances of thoughtlessness or misdirected zeal, the conduct of the utilities has been of a high standard, and their appreciation of their responsibilities to the public such as to merit respect."

Among leaders of the industry from outside of Oklahoma who addressed the convention was Martin J. Insull, president Middle West Utilities Company, who told of the various ways of financing public utilities and advised more attention to sale of securities to customers.

James B. Wootan, Chicago, editor *Public Service Magazine*, advocated the application of old moral standards to the operation of modern business, especially that of public utilities. He declared that most utility executives are trying to apply such standards.

The subject of the State regulation and present problems of public utilities was presented by W. J. Hagenah, vice-president H. M. Byllesby Engineering & Management Corporation. Rate regulation has been a pronounced success, he said. It has caused greater efficiency in financing and operation, increased the confidence of the public in utilities, made financing cheaper and easier, enabled companies to make voluntarily rate reductions aggregating many millions of dollars and benefited both the utilities and the public. In spite of this, he admitted, there is an aggressive fight against utilities in many parts of the country based on misinformation and prejudice.

During a safety conference, resolutions were adopted asking the executive board of the association to create an Accident Prevention Section. The new section will work actively to interchange ideas and experiences among members on accident prevention work, to stimulate interest in accident prevention and health work in companies which do not at present have such programs and to assist in educating the public on these matters.

On the final day of the meeting these officers were elected: President, Thomas R. Weymouth, Tulsa, president Oklahoma Natural Gas Corporation; first vice-president, T. H. Steffens, Sand Springs, president Sand Springs Railway Company; second vice-president, S. I. McElhoes, Oklahoma City, vice-president Southwestern Light & Power Company; treasurer (reelected), W. R. Emerson, Oklahoma City; manager (reelected), Edward F. McKay, Oklahoma City. R. K. Lane, Tulsa, vice-president Public Service Company of Oklahoma, was made chairman of the Electric Division and S. I. McElhoes the board member for that division.

Iowa Section Convention

ABOUT 350 members of the industry attended the operators' convention of the Iowa Section of the National Electric Light Association held at Sioux City on Feb. 26 and 27. The first general session, Tuesday morning, was devoted largely to a discussion of present practices of companies in rendering farm service. C. S. Macy, president of the Iowa Section of the N. E. L. A., presided. Reports relating to rate structures and construction were made by representatives of the larger light and power companies of the State. H. T. East of Chicago, chairman of the customer relations committee of the N. E. L. A. and representing the Public Service Co. of Northern Illinois, made an excellent talk on "This Thing Called Service."

Following the opening session the commercial men and the distribution men held separate sessions. At the commercial sessions papers by men prominent in the industry on sales management, ranges, refrigeration, advertising and the contractor-dealer's views were read and discussed.

Among the interesting papers read at the meeting of the distribution men were one by George A. Neal of the Iowa Public Service Co. of Sioux City on construction and maintenance methods which have resulted in lower costs for transmission and distribution and one by John Drabelle of the Iowa Railway & Light Corporation of Cedar Rapids on voltage regulation through voltage regulators and power-factor control. Another paper by J. B. Prince of the Sioux City Gas & Electric Co. on practical methods of locating radio interference causes elicited considerable discussion, in which the practices of various companies were explained.

The novelty of the convention was a paper read by Frank Doble of the Doble Engineering Co. at his office in Massachusetts and broadcast over the long-distance telephone.

The executive committee, which has in charge the operators' convention, was reelected with the addition of William A. Thompson of Davenport. The 1930 convention will be held in Davenport.

New Mexico Association Convention

WITH a record attendance, the fourteenth annual convention of the New Mexico Utilities Association was held at Albuquerque, Feb. 18-20.

Vice-President William W. Nielsen, manager New Mexico Power Company, Santa Fe, presided at the business sessions in place of President C. C. Ogle, who was recently transferred to a Texas property. Following the acting president's address, George E. Lewis, Denver, manager of the Rocky Mountain Committee on Public Utility Information, dwelt strongly on the desirability of convention delegates passing along the benefits derived from their attendance; Mrs. Ruth Steinhauser, director of public relations with the Texas-Louisiana Power Company, discussed "The Personal Element in Public Relations," and John J. Cooper, manager General Electric Supply Corporation, Denver, reviewed activities of the past year and pointed out that the residential field is still being neglected.

Fred Norcross, Home Gas & Electric Company, Greeley, Colo., told of the activities of the Commercial Section, N. E. L. A., of which he is division chairman. Mr. Norcross stressed the necessity of a proper rate structure in order to develop the load and thought that a 2-cent maximum rate is essential for general acceptance of the water heater.

K. W. Kissick, Deming (N. M.) Ice & Electric Company, told of his six years' experience in developing irrigation business. From the standpoint of bettering the load factor, Mr. Kissick recommended the use of ground storage tanks and smaller pumps to operate on a 24-hour basis.

Herbert Sands, consulting engineer, Denver, said that there are 148 different forms of rates in Colorado and urged more uniformity; "House Heating with Off-Peak Power" was presented by A. L. Jones, district manager General Electric Company, Denver, who told of the experiments being conducted in Fort Wayne, Ind., and A. C. Cornell, manager Graybar Electric Company, Denver, pointed out the economic necessity of the electrical wholesaler.

"Lest We Perish" was the subject discussed by George Bakewell, Jr., executive manager Electrical League of Colorado, Denver. Mr. Bakewell told of the aggressive manner in which other businesses are bidding for the consumer's dollar through national association activities and urged the industry to set the stage now in anticipation of the promotional plans soon to be launched through the Industry Sales Conference.

J. E. Loiseau, secretary Public Service Company of Colorado, Denver, opened Tuesday's session, discussing the proper selection and training of employees. He declared also that the utilities are paying 50 per cent more taxes than are economically justified. Francis C. Wilson, Water Commissioner of New Mexico, gave an analysis of the Boulder Dam situation and predicted that the generating equipment would be operated by private enterprise. Carrier telephony on transmission lines was the subject of an address by R. W. Goddard, dean of engineering, State College, New Mexico.

Officers elected are: President, William W. Nielsen, New Mexico Power Company, Santa Fe; first vice-president, Eugene A. Roberts, Southwestern Public Service Company, Carlsbad; second vice-president, Thomas C. Brown, Socorro Power & Light Company. B. L. Wiles, Albuquerque Gas & Electric Company, succeeds himself as secretary-treasurer.

RURAL ELECTRIFICATION

Conference on Rural Electrification Held in Southeastern Division

THE third of the Rural Electric Service Conferences being held by the various Geographic Divisions was staged by the Southeastern Division at Jacksonville, Fla., Feb. 13.

"Our most attractive market, and about the only remaining market, is in the rural districts," said Charles A. Collier, president of the Division, in opening the conference. "There are very few industries in this district manufacturing their own power; a large percentage of our urban homes are being supplied with electric service, and in order to extend our service, we must look to what we term rural sections," he said.

That rural electrification is to be given serious consideration is attested to by the large number of prominent utility officials who attended the conference, not only from the southeast, but from other sections of the country. With but a few exceptions, speakers on the program were men from this territory who are in close touch with developments in the rural districts as regards electrical service.

One of the most interesting speakers on the program was W. T. McCaskey, in charge of rural electrical service for the Middle West Utilities Company, Chicago, who outlined the purposes and the benefits of the conference.

H. M. Weathers, of the Alabama Power Company, read a paper prepared by W. M. Stanley, of the same company, on the organization work of the rural service department. The Alabama Power Company has been one of the leaders in rural development in the Southeast, and the paper brought many comments and occasioned considerable discussion.

The discussion following the paper was led by Charles Hammond, assistant to the sales manager of the Georgia Power Company, and A. T. Roberts, of the Columbus Electric and Power Company, Columbus, Ga.

While the morning session proved of interest and much value, the general discussions at the afternoon session provided the real "meat" of the conference. R. W. Williamson, general manager of the Gulf Power Company, started the afternoon session with a talk on Rural Rates—Types and Characteristics. C. A. Collier, who presided over the sessions, led the discussion following Mr. Williamson's talk.

It was brought out that there are numerous rates in effect on rural lines, and in many cases, despite the fact that rates are higher than for urban service, the rural lines in many cases are a losing proposition for the power companies. It was the general opinion that a careful study of rural rates be made in order that a fair rate might be decided on.

Another interesting talk was one by Charles Preston, sales manager of the Florida Power and Light Company, who described the demonstration farm of his company, and told of the many advantages of such a movement. The situation in Florida is somewhat different than in many States, and, as explained by Joe C. Guild, vice-president and general manager of Florida Power and Light Company, many of their rural lines serve customers who might be classed as industrial consumers, as in the case of fruit growers, who use electric service in preparing crops for markets, and numerous irrigation projects which consume quantities of power.

L. W. Gray, of the rural electric service department of the Georgia Power Company, discussed the effect of rural electrification in the Southeast as it affected agriculture, and pointed out several cases where farmers had increased their net profits by the use of power on the farm.

Another interesting discussion was led by E. C. Easter, agricultural engineer of the Alabama Power Company, on the effect of rural electrification within the utilities.

Dr. E. A. White, chairman of the National Committee on the Relation of Electricity to Agriculture, gave a highly interesting talk on the organization and development of rural service departments and what might be accomplished in the development of a rural market.

WOMEN'S COMMITTEE

Miss Sophia Malicki, *Chairman* Miss Isabell Davie, *Secretary*

News Letter

By Mrs. Thelma Van Ness

According to *Rail-Light News*, of the Nashville Railway and Light Co., at Nashville, Tenn., the Women's Committee is preparing for the public speaking contest soon to be held. Their subject is "How a Woman Employee Can Help Her Company Merit the Confidence of Its Customers."

* * *

Here is a suggestion from C. M. Kilian, Executive Secretary, Southeastern Division, N. E. L. A. He writes, "While attending a Women's Committee meeting the manager of the company took the opportunity of reading before the meeting the last series of newspaper ads you sent out and suggested that the women of the committee make a practice of using them as a part of their program regularly."

Note—(These advertisements are mailed to the advertising manager of your company by the Department of Public Information, N. E. L. A.)

* * *

A contest of the Wisconsin Women's Committee will end on May 1. Awards will be made on detailed reports of the activities and accomplishments of Women's Committees and individual members of Women's Committees. Awards will be based upon:

1. The program of activities adopted and carried out by the individual club or organization.
2. The attendance in proportion to the number of women in the club or group.
3. The activity of the individual members in civic affairs in their particular localities.

* * *

Between October and January the Women's Committee, Metropolitan New York Section, N. E. L. A., composed of one representative from each of the Metropolitan companies, held four regular monthly meetings. Several members of the committee acted as hostesses and the meetings were held in their respective company buildings. Each meeting was followed by an inspection trip of instructive value to the committee members. The inspection trips included:

East River Generating Station (The New York Edison Co.)
Edison Lighting Institute, Harrison, N. J.
Model Apartment — (Westchester Lighting Co.)
Modern Apartment—(The Yonkers Electric Light & Power Co.)

The committee members have held successful educational meetings in their individual companies. The following is a list of the subjects presented in talks to women employees at these meetings:

Electrical Appliances—Use and Care
Why Public Utilities Merchandise
Proper Lighting for the Home
Power Plant Operation
Safety
Preparation of Food by Use of Electric Refrigeration
Interior Decorating
Educational Courses for Women in Public Utilities
Telephone Courtesy
Why Women Work

In the various companies classes have been held, in which the following subjects were taken up:

Cooking by Electricity
Resuscitation (booklets on resuscitation have been widely distributed)
Educational Courses on Public Utility Information

The women employees have also taken inspection tours of educational value. These trips included:

Livingston Power Station (Staten Island Edison)
Modern Apartment (Yonkers Electric Light & Power Co.)
Model Kitchen (Staten Island Edison)
Women's Art & Industries Exposition
Electrical Show, Grand Central Palace

The following presentations at company meetings proved enjoyable as well as educational:

When the Whole World Electric Went on Strike
Wanted a Stenographer

* * *

The Women's Committee of the Southwestern Gas and Electric Co. held a six months' contest to determine the most useful and willing worker in each division of the group.

A careful record was kept of each girl's activities during the period; copies of all talks made were kept. At the end of the contest a summary of each girl's activities was compiled and copies of the talks made were attached to her record. The judges were the executives of the company.

The points on which the girls were graded each month were:

Attendance
Willingness
Faithfulness
Talks made
Preparation of talks
Voluntary work
Willingness to work after office hours
Work in standing committees
Participation in programs
General attitude and interest

The award was a trip to the geographic convention.

Miss Wingate, chairman of the Women's Committee of the Southwestern Gas and Electric Co. remarks on this contest as follows:

"The judges had the following to say in regard to the contest:

"'The reading of these papers was a revelation and a gratification to all the judges, more particularly to the writer, who has not heretofore been acquainted with work of this sort. I was particularly impressed by the fact that each lady who entered the contest was graded practically 100 per cent on her faithfulness and willingness.

"'I am convinced that if all the employees of the Southwestern Gas & Electric Co. have the same enthusiasm and loyalty for the company and the same idea of public relations, trouble with your public will be unknown.

"'You are to be heartily congratulated upon the success of the efforts you have put forth in training these young ladies.

"'The judges wish to express their appreciation of the splendid records as shown by these reports. The willingness of the individual members and the loyalty shown are things of which the company can well be proud. The papers submitted show unlimited study and preparation. We congratulate the Southwestern Gas & Electric Co. on its women employees.'

"It is the belief of those in charge of this work that the contest has been the means of developing the greatest per cent. of the members of each committee. All of the girls have taken a most active and interested part in the work, and have developed greatly in public speaking. Some have shown hitherto unknown ability for leadership, through their work on the program committee and other committees. All phases of the National program have been considered during this contest, and talks on safety, rural electrification, electricity in the home, home service, refrigeration, and economics have been given. We believe that we have a well informed group of employees in the Women's Committees of our company, and an organization upon which the company can depend for loyalty, courtesy, and intelligent furthering of the company's interests."

* * *

A feature of a report from the New England Division is a "Medley-Personal Efficiency" which was presented by the Women's Committee, Public Service Company of New Hampshire, at the 20th Convention of the New England Division last fall. It was arranged by Miss Grace A. Phillips, Company Chairman. Miss Edna Annis was the leader, assisted by Mrs. Marion Lander, Miss Madeline Whelan, Miss Ellen O'Keefe and Miss Ethel Achilles. Each one discussed a phase of personal efficiency. These talks are suitable Women's Committee program numbers. The complete medley has been printed in pamphlet form. Copy of the pamphlet will be sent upon request to the office of Secretary, Women's Committee, N. E. L. A., 420 Lexington Avenue, New York.

Miss Alice M. Baker, chairman of the Women's Committee, New England Division, was given a place on the program of the Commercial Section at this convention.

"Farm Electrification and Rates" is the topic of a talk given by Prof. E. W. Lehmann to the various division meetings of the Women's Committee of the Central Illinois Public Service Co. The pageant "Evolution of Lighting," has also been a feature of the meetings of these groups.

* * *

The February issue of *Current Topics,* published by the North American Light and Power Utility group, boasts a "Women's Page" with Miss Betty Ewing, Editor. There are pictures of the Women's Committee leaders of Illinois, Iowa and Kansas. Miss Ewing is the chairman of the Middle West Division Women's Committee.

* * *

At a recent meeting of the Women's Committee of the Public Service Co. of Northern Indiana, at Hammond, Mrs. Leila M. Blomfield of Chicago was the speaker. Her topic was "The Romance of Electric Power." She depicted in her talk the struggle of mankind to bring electricity into practical use and illustrated its advancement by colored stereopticon pictures. Guests at this meeting included officers of several Hammond women's business and professional clubs.

* * *

A report from West Virginia gives us the information that the Women's Committee at Huntington presented the playlet, "Electrified Eliza," before the Rotary Club of that city.

* * *

The activities of the Women's Committee in the East Central Division are many and varied. Miss Esther Rockey, of the Dayton Power & Light Co., Dayton, is chairman of this division. The Home Service Department of the Ohio Public Service Co., under the leadership of Mrs. Ella Smethers, is presenting excellent programs and carries on interesting activities. During the Vacation Bible School held in Ashland, women of the Ashland Division taught the children lampshade making during their recreation period. English has been included in the course of study of some of the divisions. Another interesting number was a demonstration of an electric washer sale on the Sales Floor of the Massillon Division in which one member of the committee took the part of a saleslady and another that of a colored customer. The Lorain Division has studied Parliamentary Law. The Cleveland Division visited the new building of the Ohio Bell Telephone Co. Outstanding work has been done by Miss Agnes Kalter of the Elyria Division. Miss Kalter holds a regular position in the Ohio Public Service Co., but has also developed and demonstrated her ability to carry on Home Service Work in that district. Members of the Elyria Women's Club have been entertained with bridge luncheons—an electric range demonstration being conducted before the meeting, the food prepared and placed in the oven, and after the guests are finished with their bridge game, the luncheon served. Miss Kalter also conducts demonstrations in customers' homes whether in cooking or better lighting in addition to her regular duties.

Most of the Home Service work done by the Ohio Public Service Co. has been developed through young women who have held regular positions with the company whether office, telephone or sales work.

* * *

According to *The Looking Glass* reflecting the Electrical Women's Round Table, Inc., of Greater New York, the Home Service Division of Westchester Lighting Co., Mrs. Cecil Harvey, director, with Miss Helen O'Brien and Miss Elizabeth Robbins, assistants, has given 94 lecture-demonstrations in the period between September and December, 1928. One of the features of this Home Service Department is a "Cooking Course for Brides." The Home Lighting Section, through its representatives, Mrs. Sarai Waugh and Miss Elizabeth Todd, has given 21 home lighting lectures during the same period.

* * *

"The Women CAN Sell Appliances" was the subject of an article regarding a one-month merchandise campaign, written by Miss Ethel Bilbrey, chairman, Women's Committee, Birmingham Electric Co., Birmingham, Ala., in a recent issue of *Electrical South.* In this sales campaign on electric table appliances and electric irons, approximately $3,000 worth of appliances was sold by committee members—200 in number.

MAGAZINE ARTICLES

BELOW IS A LIST of articles which appeared in various magazines recently that are especially interesting to Women's Committee members:

The Household Magazine—March.
  Modern Devices Banish Sir Dust—Harriet W. Allard.
  Electricity—The Chore Boy—Esther L. Service.
Modern Priscilla—March.
  The Value of Convenience Outlets—Eloise Davison.
  The Daily Round—Dishwashing—Margaret H. Hartnett.
McCall's Magazine—March.
  What of Your Ironing?—Anne Pierce.
Holland's—March.
  Lighting the Home for Comfort and Beauty—A. W. Roe.
Good Housekeeping—March.
  Plumbing That Meets Your Needs—George W. Alder.
Better Homes and Gardens—March.
  Versatile Waffles and Griddle Cakes—Nell B. Nichols.
House and Garden—March.
  Electrical Aids for the Home.
Sunset Magazine—March.
  Baking-Day Insurance—Dorothy E. Shank.

To Advertising and Public Relations Managers of Electric Light & Power Companies

Devote a few days to planning your contribution for winning the

FORBES
Public Service Cup

The cup will be awarded at the fifty-second convention of the National Electric Light Association.

PUBLIC SERVICE CUP
FORBES MAGAZINE
As winner of the first prize in a national contest for the most constructive public relations campaign carried on by a light and power company in local territory during the past year

Then—get it in shape and forward to us, before

MAY 1st

We will be glad to send you upon request the conditions governing this Contest if you have not already received them.

Contest Manager
FORBES MAGAZINE
120 FIFTH AVENUE
NEW YORK CITY

WHAT OCCURRED LAST MONTH

Consolidations

The Public Service Commission of Maryland has granted permission to the Empire Public Service Corporation to purchase for $418,000 the four Western Maryland electric companies concerning which litigation has been before the Commission and courts for the past two years. The present price is $50,000 less than the price proposed heretofore and which the Commission declared was exorbitant.

* * *

Announcement was made on March 13 that control of the Southern California Gas Corporation and of its operating subsidiaries has been acquired by the Pacific Lighting Corporation.

* * *

The Federal Trade Commission's Investigation

Resuming its hearings on publicity of the utilities, the Federal Trade Commission on March 13 heard testimony concerning the activities of the California Electrical Bureau, with Victor M. Hartley of San Francisco, Executive Secretary of the Bureau, as witness.

* * *

On March 14 the Federal Trade Commission heard further testimony of Victor M. Hartley of San Francisco, executive secretary of the California Electrical Bureau.

* * *

On March 15 the Commission transmitted to the Senate its Twelfth Interim Report on the investigation. This declares that during the period covered by the report the examination of the books of accounts of two holding company groups was completed and work begun on the operating companies of one of the groups. Field work on the relations between utility groups and service organizations was begun in the offices of two other holding company groups, the reports declare. It also mentions the filing of a brief in its case against the Electric Bond and Share Company and the hearings on March 13 and 14. The report also lists witnesses from the Pacific Coast who have been asked to appear on March 21, 27 and 28.

* * *

On March 20 the session of the Commission was devoted to the introduction of documents relating to the California measure to permit entry of the state into the public utility business, which has three times been defeated by the voters. No witnesses were called.

* * *

Hydro-Electric

A report of the Geological Survey says that on January 1, 1929, the total capacity of water wheels in hydro-electric plants of 100 horsepower or more was 13,571,000 horsepower, about 10 per cent more than on January 1, 1928.

* * *

A report by the Division of Water Resources and Engineering of North Carolina says that production of electricity by water and steam in North Carolina for 1928 was 2,265,544,000 kw.-hr. as compared with 2,086,534,000 in 1927. 2,037,974,000 kw.-hr., or 89.5 per cent of the total, was produced by water-power.

* * *

A dispatch from Seattle says that work on the 400,000 hp. hydro-electric plant at Priest Rapids on the Columbia River is to be started in the near future.

* * *

The Appalachian Electric Power Company announces that it is to spend $11,000,000 on a hydro-electric plant on the New River in Virginia.

* * *

The Senate Committee on Agriculture and the Public Lands Committee of the House have reported favorably the Shipstead-Newton Bill designed to prevent creation of reservoirs and erection of power dams in the Rainy Lake district, along the northern boundary of Minnesota.

* * *

The Federal Power Commission announced that it has referred to its legal staff the application of the Cumberland Falls Hydro-Electric Company for a license to construct a project at Cumberland Falls in Kentucky. The Commission, the statement says, desires an opinion concerning its jurisdiction on matters involved in the application, other than questions of navigation.

* * *

The Federal Power Commission, on March 1, approved a report submitted by its Executive Secretary, O. C. Merrill, recommending promulgation of an order requiring licenses of the Commission to file notice with the Commission of intention to issue securities in those cases where the Commission's jurisdiction exists and thereafter to leave to the determination of the Commission, in individual cases, whether it will or will not exercise its jurisdiction.

* * *

A dispatch from Brawley, California, says that a publicity-owned hydro-electric project for Imperial Valley is being urged by officials of the Imperial Irrigation District. The proposed project would make use of power-sites along the irrigation canals.

* * *

The Minnesota House of Representatives has before it a measure authorizing the state to acquire, develop and operate hydro-electric projects and to issue bonds for the same up to $50,000,000. Another bill before the House proposes an annual rental fee of 25c. per hp. on all water-power produced in the state.

* * *

A dispatch from Vancouver announces that the British Columbia Power Corporation is to construct a plant on the Campbell River, about a mile from its mouth, which will develop from 85 to 90,000 hp.

* * *

On March 9 the Philadelphia and Reading Coal and Iron Company announced plans for a dam across the Susquehanna River and a $6,000,000 electric power plant at Herndon, this being part of its plan to electrify its mining operations.

* * *

J. R. Cook, representative of the Ontario Government on the Ontario Hydro-Electric Commission, has presented to the Provincial Legislature proposals for further hydro-electric development involving 600,000 hp. on sites ranging from the Mississipi River to the upper Ottawa River. Mr. Cook predicts a power shortage within twenty years in spite of the maximum generating capacity of Niagara and the proposed development on the St. Lawrence and the Ottawa.

* * *

Production of Electric Current

The Department of Commerce, in an announcement saying that the production of electricity by public utility power-plants in January exceeded all previous monthly records, reaching a total of 8,219,000,000 kw.-hr., calls attention to the fact that this production was over twice the production during the entire year of 1905.

* * *

Rates

The president of the Syracuse, New York, Lighting Company announces that a reduction in gas and electric rates will be announced by the company not later than June 1 and perhaps by May 1.

* * *

The Narragansett Electric Lighting Company has announced a new rate-schedule, effective April 1, for Providence, which is expected to save customers at least $70,000 a year. The new initial rate will be five cents.

* * *

The Iowa Supreme Court has decided in favor of the town of Mapleton in its suit to compel the Iowa Public Service Company, which furnishes electric service in Mapleton in competition with the municipal plant, to raise its rates.

* * *

The Nebraska Power Company has announced voluntary reductions in residential rates for Omaha, which are expected to mean a saving to customers of about $200,000 annually. The initial rate is to be 5½c., which will apply to an amount equal to 10 kw.-hr. per room, per month. For the next 160 kw.-hr., the price will be 3 cents and for all above that 1½ cents. The old rate was 5½ cents straight.

The Standard Gas and Electric Company announces that rate-reductions totaling approximately $4,820,000 annually were placed in effect in 1928 or announced for the near future by subsidiary and affiliated companies.

* * *

Reduced commercial lighting rates for Meadville, Pennsylvania, mean a saving of not less than $6,000 a year to consumers.

* * *

Regulation

A bill introduced in the Indiana Legislature authorizes cities owning utility plants to enter into a contract for a period of not more than twenty-five years for wholesale purchase of service from an outside company, or to lease their plants to a private corporation for not more than twenty-five years.

* * *

A bill introduced in the Iowa Legislature authorizes organization of rural utility districts. It does not permit purchase of generating plants, but sanctions purchase or construction of distribution systems receiving current from private or municipal plants.

* * *

The Kansas House has adopted a bill, already passed by the Senate, providing that appeals from orders of the State Public Service Commission shall be taken to the district courts in the counties in which the orders are applicable.

* * *

The Nebraska Senate has defeated a bill requiring payment in cash when municipal utilities are sold.

* * *

A bill has been introduced in the Maryland Legislature to give authority to the Public Service Commission over electric energy imported from other states. The Maryland Assembly has defeated the bill calling for election, rather than appointment, of the members of the Commission.

* * *

The Ohio Senate has passed a bill repealing the Pence Law, which permits Ohio utilities to put rate-increases into effect prior to a ruling by the Public Service Commission. The bill has been sent to the House.

* * *

The Indiana Senate, by a vote of 36 to 8, has passed the Moorhead Bill, bringing utility holding companies under the jurisdiction of the Indiana Commission.

* * *

The Wisconsin Legislature has before it a bill declaring natural scenic beauty to be a public right and giving the Railroad Commission authority to withhold a water-power permit where it finds the construction, operation or maintenance of the proposed project contrary to such public right.

* * *

Home rule of public utilities by municipalities with a population of 2500 or more is called for in a resolution introduced in the Kansas Legislature.

The Missouri House has defeated a bill calling for a state commission to make a survey of water-power resources and to recommend legislation on the subject.

* * *

The Nebraska Legislature is considering a proposal to allow municipal plants to build as far as twenty-five miles outside city lines to serve customers.

* * *

The Committee on Power and Light of the Massachusetts Legislature has been holding hearings on the bill sponsored by the Massachusetts Department of Public Utilities, which is intended to bring public utilities into a contractual relationship with the state and to cause utilities to accept rate rulings by the Department without an appeal to the courts.

* * *

The Vermont Legislature has defeated the bill which sought to impose a tax on electric energy.

* * *

A bill to prevent new rate-schedules from becoming effective until final action by the Public Service Commission has been introduced in Pennsylvania. Heretofore the rule has been that schedules become effective thirty days after being filed.

* * *

On March 6, the Public Utilities Committee of the Ohio House of Representatives recommended for passage the bill repealing the Pence Law, which permits public utilities to put rates into effect pending sanction of them by the Public Utilities Commission.

* * *

The Indiana House of Representatives has defeated, by indefinite postponement, the Moorhead Bill, which had for its purpose the bringing of investment or holding companies under the jurisdiction of the Public Service Commission.

* * *

A bill introduced in the Wisconsin House prohibits utilities from generating electric current from streams in Wisconsin and transmitting the power outside of the state to be sold at a lower rate than the same company gives Wisconsin users.

* * *

A bill has been introduced in the Missouri Senate forbidding electric and gas companies to charge penalties for failure to pay bills on time. A bill in the Missouri House declares 7 per cent upon the fair value of property to be a lawful rate of return for utilities.

* * *

The Public Utilities Committee of the Kansas Senate has brought in a resolution directing the Public Service Commission to conduct an investigation and survey of gas and electric rates in Kansas and to make an adjustment of the rate structure.

* * *

The Committee on Conservation and Reclamation of the Texas House of Representatives has reported adversely a bill to revoke permits granted by the State Board of Water Engineers for dams across public streams on which construction work had not been completed Jan. 1, 1929. The proposed bill would have affected a number of hydro-electric projects.

* * *

The North Dakota House has defeated a bill to appropriate for a survey of public utilities in the state by the Board of Railroad Commissioners, and has passed a bill to provide uniform procedure for assessment of utilities.

* * *

The Legislature of the State of Washington has before it a bill providing that all electric current sold in the state would be subject to a tax of one mill per kw.-hr.

* * *

The Joint Committee on Water Power of the Maine Legislature has been holding hearings on bills which would permit the export of electric current.

* * *

West Virginia's newly-enacted water-power law includes a section reconciling the positions of those opposing and favoring export of electric current by providing that under all licenses, except those of railway corporations, licensed for their own use, the reasonable needs of consumers in the state who can reasonably be served by the licensee shall have preference. It is thought that the new law will encourage hydro-electric development in the state.

* * *

The North Carolina Senate has passed an education bill, which calls for an increase in the tax on gross receipts of power companies from 1 to 2 per cent.

* * *

Ohio has passed the bill repealing the Pence Law, which permitted public utilities to put rates into effect pending sanction by the Public Utilities Commission. The new law provides for a Fact Finding Committee as a division of the Utilities Commission. This committee is to have a superintendent who is to be appointed by the Commission.

* * *

The Oklahoma House has passed a bill authorizing municipalities to own and maintain property outside of corporate limits, and to issue bonds against this property.

* * *

The Michigan Senate has passed the Rushton Bill, requiring gas and electric companies to secure a certificate of convenience and necessity in certain cases.

* * *

The Minnesota Legislature has defeated the proposal to bond the state for the purpose of developing water power up to the amount of $50,000,000.

* * *

St. Lawrence

Prime Minister King of Canada, in a statement in the House of Commons, has declared that it will be at least several months before Canada can begin negotiations with the United States for a treaty on joint development of the St. Lawrence waterway. Mr. King said negotiations could not be started until there was complete accord between the Federal Government and the Provinces of Ontario and Quebec as to their respective rights in the matter of ownership of power developed as the result of developments for navigation purposes.

* * *

On March 12, Governor Roosevelt of New York submitted to the Legislature his plan for development of St. Lawrence power, which calls for appointment by the Governor, with the consent of the Senate, of a board of trustees, which would prepare a definite plan for generation of power by the state and distribution, if possible, by private companies, this to be submitted to the Legislature for ratification.

* * *

The Dominion Government at Ottawa has approved plans of the Beauharnois Light, Heat and Power Company, already sanctioned by the Province of Quebec, to build a power canal and accompanying hydro-electric works between Lakes St. Louis and St. Francis in the St. Lawrence River, twenty miles from Montreal. The company plans a development of 500,000 hp. The agreement provides that the company is to turn the canal over to the Canadian Government at any time, should the government wish to use it as a part of the greater St. Lawrence waterway.

* * *

On March 19, a bill embodying Governor Roosevelt's recommendation for the creation of a Board of Trustees to plan for and handle development of the St. Lawrence hydro-electric resources, was introduced in the Senate and House of the New York Legislature by Democratic leaders.

* * *

Sub-Metering

The Public Utilities Commission of the District of Columbia has decided that owners of large buildings will not be permitted to purchase electricity at wholesale rates and retail it to their tenants.

* * *

Real estate interests of New York City continue to oppose abolition of sub-metering. A report prepared by two New York real estate organizations claims that abolition of sub-metering will cause building owners a loss of $10,000,000 a year.

LEGISLATION

Status, at Close of Seventieth Congress, of Legislation of Interest to Public Utilities

Boundary Water Measures.

The Federal Government gave its consent to compacts on boundary water disputes between the following States:

New Mexico and Oklahoma respecting the waters of the Cimarron River and others (H. R. 6496)

New Mexico, Oklahoma and Texas respecting waters of all streams in which such States are jointly interested (H. R. 6497)

New Mexico and Arizona (H. R. 6499)

Colorado and New Mexico (H. R. 7024)

Colorado, Oklahoma and Texas (H. R. 7025)

[Colorado and Utah (H. R. 7028) passed the Senate with amendments; these were not agreed to and the bill failed.]

Bus Regulation.

Identical bills (S. 5085 and H. R. 15621) for the regulation of interstate commerce by motor vehicles were prepared by the Senate and House Committees, introduced by the respective chairmen, and referred to the committees for formal report. Neither bill, however, was reported out of committee.

Boulder Dam.

The Swing-Johnson Bill (H. R. 5773) providing for construction of Boulder Dam, the development for sale of power, etc., subject to State compacts, became a law Dec. 21, 1928.

Columbia Basin Development.

The original Columbia Basin development bill (S. 1462) was changed and passed by the Senate, so as to provide for an investigation and survey of the possibilities of the project. This bill was favorably reported by the House Committee. On a motion to suspend the rules and pass the bill the necessary two-thirds was not secured, and the bill failed.

Communications Commission.

The Watson bill (S. 5104) proposing to create a Federal Communications Commission, was not acted on by the Interstate Commerce Committee.

Deschutes Project.

The bill (S. 1186) to provide for the construction of the Deschutes project in the State of Oregon was passed by the Senate and favorably reported by the House Committee. No further action was taken. The similar House Bill (H. R. 307) was not reported.

District of Columbia Street Railway Merger.

A compromise bill (S. J. Res. 208) was reported by the Senate Committee in the closing days of the Congress. An identical bill (H. J. Res. 406) was also reported in the House. The Senate bill was given a preferred position, but was not reached.

Federal Power Commission.

The bill (H. R. 8141) to increase the personnel of the Federal Power Commission was favorably reported by the House Committee on Interstate and Foreign Commerce, but was defeated on the floor of the House. The companion Senate bill (S. 1606) was not acted upon by the Senate Committee on Commerce, to which it was referred.

The Hull bill (H. R. 15575) amending the Federal Water Power Act, was introduced at the second session and referred to the House Interstate and Foreign Commerce Committee. No action was taken on it. The author sent his explanation together with the bill to all States for comment.

Federal Trade Commission.

The total sum appropriated for the Federal Trade Commission for the fiscal year 1930 was $1,277,760. Of the total amount appropriated, $250,000 was made immediately available for use in the utilities inquiry. (According to the report of the House Appropriations Committee this represents an increase for this year of $229,760 traceable to the utilities inquiry). In addition, $70,240 was carried in the Second Deficiency Appropriation bill to supply Federal Trade Commission deficiencies for the fiscal year 1929.

Flathead Indian Reservation.

The 1930 Interior Department Appropriation Bill provided $10,000 for operation and maintenance of the power distributing system in 1929, together with $40,000 for the construction of laterals near Roman. These amounts to be taken from the $395,000 previously authorized.

The Second Deficiency Bill, 1929, provided a total of $220,000 for various construction work and further provided that any portion remaining should become applicable during the fiscal years 1929 and 1930 to the construction of power transmission lines and the purchase of power if and when license for the development of power on the Flathead River shall have been issued by the Federal Power Commission as provided in the Act of March 7, 1928 (45 Stat., pp. 212, 213).

Flood Control Surveys.

The House flood control bill (H. R. 13484) was enacted, authorizing preliminary examinations of sundry streams with a view to the control of their floods, improvement of navigation and economical development and utilization of water power.

Injunctions.

A subcommittee of the Senate Judiciary Committee prepared a bill to replace the Shipstead anti-injunction bill. Hearings were held but the the bill was not reported. (S. 1482.)

The House Judiciary Committee held

hearings on the House bills (H. R. 7759 and H. R. 10082) but took no action.

Interior Department Appropriation Bill.

The Department of Interior Appropriation Bill (H. R. 15089) carries several items under Bureau of Reclamation and Indian Service providing funds for construction and operation of power plants and in some cases transmission lines for various purposes. (See Flathead Indian Reservation, San Carlos Reservation-Coolidge Dam, herein, as examples.)

Limitation of Jurisdiction of District Courts.

The Norris Bill (S. 3151) was favorably reported by the Judiciary Committee and put on the calendar but was not acted on by the Senate. No action has been taken on the Wagner bill (S. 4491).

Lobby Bills.

The Caraway bill (S. 1095), providing for the registration of lobbyists, passed the Senate at the first session of Congress. Hearings were held by a subcommittee of the House Judiciary Committee, but the bill was not reported.

Muscle Shoals.

The Norris-Morin Muscle Shoals Corporation bill was pocket vetoed. Validity of this veto will be determined in analogous case to be argued before the Supreme Court March 11.

The Madden Bill (H. R. 8305), embodying the Cyanamid offer, was reported to the House by the Military Affairs Committee. The Rules Committee did not report a rule for its consideration. Majority and minority reports were filed by Representative Reese and by Representative Morin, chairman of the committee.

Niagara Falls Treaty.

A resolution (S. Res. 333) introduced by Senator Borah was adopted by the Senate on Feb. 26. It authorized the Senate Committee on Foreign Relations to investigate the subject of the convention and protocol between the United States and the King of Great Britain for the preservation and improvement of the scenic beauty of the Niagara Falls and Rapids concluded at Ottawa on Jan. 2, 1929.

Radio.

The White Bill (H. R. 15430) was adopted by both houses after being amended to extend the life of the Federal Radio Commission to Dec. 31, 1929. Proposed restrictive provisions affecting public utility radio stations were not adopted.

Rivers and Harbors.

The River and Harbor Bill (H. R. 14066) was reported by the House Committee during the first session of the Congress. It was not pressed for passage.

San Carlos Reservation (Coolidge Dam).

Funds previously made available for construction of a transmission line, including substation, from the Coolidge Dam is further made available for pumping plants, purchase of equipment, etc.

St. Lawrence Waterway.

A bill (H. R. 5613) by Representative Mapes of Michigan, providing for a deep waterway between the Great Lakes and the St. Lawrence, by way of the Welland Canal, and accompanied by reports from the State, War and Treasury Departments, was not acted upon.

State Regulation of Distribution of Electric Energy.

A bill (S. 3920) for such regulation where the transmission or disposition is in interstate or foreign commerce was introduced by Senator Tyson in the first session of the Congress. No action by the Senate Interstate Commerce Committee.

Umatilla Rapids Development.

The bill introduced by Senator McNary (S. 1187) was not reported by the Senate Committee on Irrigation and Reclamation. Hearings were held.

The House Bill (H. R. 306) was favorably reported by the House Committee but was objected to when reached on the Consent Calendar. No rule was obtained.

NOTE: A special session of the 71st Congress has been called by the President to convene on April 15, 1929.

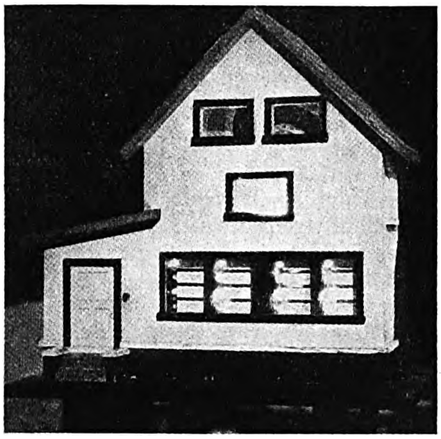
THE IDEA MILL

Novel Safety Bulletin

By A. F. LEMMON

Safety Supervisor Blackstone Valley Gas & Electric Co., Pawtucket, R. I.

TO attract attention to safety matters in a somewhat unusual way, an illuminated bulletin board in the shape of a miniature house was recently built out of scrap material by the substation department of this company in the spare time of the men. The bulletin is mounted on an outdoor platform near the shipping division at the Pawtucket service station, and its main features consist of sets of windows in which are displayed disks and messages which appear according to predetermined sequence upon the pressing of a button at the side of the miniature doorway. The upper windows reveal a revolving colored disk to call attention to the display, the middle window contains a 3-in. x 4-in. card display and the lower window contains thirteen spaces representing the different sections of the distribution department.



When the button is pushed miniature lamps behind red and green glass buttons above the thirteen departmental sections are energized, crews free from accidents in a stated period being spotted by green lights. The colored disk at the top of the house revolves and the lower disk turns one-twelfth of a revolution, bringing a new message card into view in the middle window. The colored disk stops revolving when the card reaches the reading position, and after an interval the disk resumes rotation and other cards are brought into view until a set of twelve has been exposed.

A Tip for Manufacturers

THE City of Stockholm has set an excellent example for American cities. Its house numbers are to be illuminated at night.

It is a reform which has been urged and discussed there for many years, as it has been by a great many individuals and communities in this country. Recently, however, cab drivers and physicians have complained so vigorously that definite action is to be taken by municipal authorities.

Illuminated numbers at night imply visible numbers in the daytime. There are times when a person looking for a building in a strange neighborhood feels despairingly that nothing short of the millennium will correct the hopeless situation that exists in so many places —invisible house numbers, or none at all.

If Stockholm can put over this reform, cities on this side of the Atlantic should be able to do so.—Editorial, *Yonkers, N. Y., Statesman.*

Correction

ON page 128 of the February N. E. L. A. BULLETIN the review of the serial report "Progress in Generator Design and Practice" erroneously credited the report to the Prime Movers Committee. The report was prepared by the Electrical Apparatus Committee.

Picked up from

ELECTRICAL NEWS ITEMS

Issued weekly by Department of Public Information, National Electric Light Association, 420 Lexington Avenue, New York City. All or part may be used without further notice and with or without credit being given.

Electricity and Vitamins

THE average business man of today, taking little exercise in the winter, could not have kept his efficiency to a high degree had he not been able to purchase a year round diet rich in vitamins. This has been made possible, according to A. J. Authenreit, vice-president of the Middle West Utilities Co., because of refrigerated vegetable and fruit shipments.

In discussing the development of electric refrigeration, Mr. Authenreit told the Midwest Power Engineering Conference at its recent meeting in Chicago, that the electricity consumed for cold storage equals 310 million kilowatt-hours and that the small electric refrigerators that are growing in popularity for home use and moderate sized commercial refrigerators consume 630 million and 584 million kilowatt-hours respectively.

How great this business has become in the last few years was revealed by the figures quoted. The number of cars of meats sent out under refrigeration is 300,000 a year. While undoubtedly most of these cars are cooled with either natural or manufactured ice the tendency is toward electric refrigeration. Cooled ships and trains make it possible to bring in 64 million bunches of bananas from the tropics. All cars containing perishables kept with ice numbered 975,000 and the ice they consumed reached 12½ million tons.

Cost of Generation

THE total cost of generating electricity, states the Salt River Water Users' Association in a recent number of the *Associated Arizona Producer*, is only 10 per cent of the total cost of electric service to its rural customers. Furthermore, a wide spread of rates for electricity for various classes of consumers, varying from 7/10 of one cent to 12 cents per kilowatt-hour, is entirely justifiable.

In announcing a new schedule for retail power service, the Water Users' Association calls attention to the fact that the average rate paid on consumers' lines is estimated to be composed of the following essential items.

	Per cent of total power costs
Generation	10.1
Transmission	5.1
Distribution	84.8

"Power," says the *Associated Arizona Producer*, "must be on the line to supply current whenever it is needed. The interest on the big investment in the power system, the operation and maintenance costs and other overhead expenses go on 100 per cent of the time, nevertheless, so such a use of power must necessarily pay a rate which will cover the cost of holding the power in readiness as well as the power actually consumed. . . .

"It may be assumed that the present rates are as nearly equitable as six months' careful study can make them. They are adjusted on the theory that the association will, after all costs of service are deducted, get the same net price for its power, whether used in large bulk such as for mining at a 7/10 cent rate, or in the smallest quantities for lighting at a 12 cent rate. The wide difference in these rates is simply a matter of difference in cost of service. The big factor in cost to small users is the cost of distribution, which amounts to 85 per cent of what the consumers pay."

Electrified Fox Farms

IT is easier to feed foxes when your farm is electrified, is the conclusion voiced by George Banzhaf of Milwaukee, who manages an extensive fox farm in Manistique, Mich. Mr. Banzhaf conducts his business on a large scale and sells his pelts every year in the New auction rooms.

A mixture of horse meat and stale bread, with a slight proportion of other ingredients, is the main dish offered to the hundreds of foxes that are kept in pens until late in the spring when they are allowed to run in the large fenced enclosure. When the business was started, about four years ago, with a few animals, the food was prepared by hand, but modern methods have been installed since electricity has been put on the pay roll.

When the horses are killed—about 200 are required during the year—they are frozen solid in a large electric refrigerating chamber and cut into blocks with an electric saw, after which the blocks, hard as wood, are stacked in a cold storage room. As they are needed, the blocks are gradually thawed, to prevent the meat from becoming black, and the bones are removed.

The next stage in the preparation of this food is to pulverize the bone in one machine and grind the meat in another. In proper proportions these are then transferred to a mixer, constructed much in the manner of a large bread mixer in a modern bakery, and then the bread and other ingredients, such as salt and some medicines, are added. The stale bread, purchased from bakeries in Milwaukee and Manistique, has been finely ground on the floor above the mixing room by another electric contrivance, and it comes down a chute to be added to the bone and meat. Salt and a few other things are put into the mixer, the switch is thrown and the resulting product, for bigger and better foxes, resembles so much hamburger steak. "And the foxes like it," says Mr. Banzhaf, "and this way of preparing the food assures a properly balanced diet that is clean and thoroughly mixed."

Needless to say, the people that work on this novel farm also enjoy the benefits of electrification. Although four miles from the nearest town, the house has a host of labor-saving appliances that would do credit to the average city home. The driveway is lighted every night and large floodlights have been installed to enable the fox-farmers to watch their pens at night, for foxes are valuable and must be guarded from thieves and marauders.

"It would not be possible," says Mr. Banzhaf, "to operate this enterprise with our present staff if it were not for the constant aid and efficiency of our electrical machines. We are not promoting a menagerie but are actively in the business of raising animals for fur. Electricity is a big asset."

Electric Traffic Checker for Holland Tube

AN electric traffic checker registers every automobile passing through the Holland Tunnel that connects New York and New Jersey. According to *Forbes Magazine*, a small floodlight is mounted in an inclined position upon the overhead ironwork of the exit. A slender beam from the light falls upon a small circular window in a box placed beneath the sidewalk at the opposite side of the roadway.

The box contains a sensitive photoelectric tube, an amplifying tube and an electrical relay. When a vehicle passes, the beam is interrupted. The photoelectric tube is affected, so that a slight electrical impulse results. This is amplified by the vacuum tube and fed to the relay, energizing a transmission circuit, the other end of which is in the commission's office. A dial there, actuated by the electric current, registers another figure in response to each impulse from the relay.

The Holland Tunnel is also making use of adaptations of the Televox principle by centralized control devices for stopping traffic, fire alarms, etc.

THE REVIEWING STAND

Electric Power Survey of Ohio, West Virginia and Kentucky.

By Power Survey Committee, East Central Division, N. E. L. A., 59 pages, with numerous illustrations, graphs and maps. Single copies, $1 each. Five or more, 50 cents each. Order from D. L. Gaskill, secretary, East Central Division, N. E. L. A., 603 Broadway, Greenville, Ohio.

"HITHERTO," wrote Gen. George Washington, "the people of the western country, having no excitements to industry, labor very little." This was in 1784. Times have changed somewhat, and the leisurely West which he was describing is the great region which now composes the states of Ohio, West Virginia, and Kentucky, and the western counties of Pennsylvania.

In less than 150 years it has become the seat of the heaviest industries in all the world; the home of steel, coal, automobiles, and electric power; peopled by upwards of 12,000,000 persons; bound together by railroads, broad highways, and telephones; one of the most intensely integrated economic provinces on earth.

It is with these well chosen sentences that the first section entitled "The East Central Division and Its Resources" is introduced.

The second section of this survey devotes several pages to a discussion of "Industry and Power in the East Central Zone." The important economic position held by the East Central territory is clearly brought out here by interesting data on Transportation, Agriculture, Manufacturing, Mines and Quarries, and Electric Power.

The "Economic Background of the States" is the title of the third section of the survey and it deals with the relation of the volume of electricity used to the degree of advancement of the region served. Further it shows how the inherent natural resources of the region have influenced the growth of the electric power industry in the region. In the report's own words, "The volume of electricity generated and transmitted depends upon the degree of advancement of the region, and this in turn upon many factors. By making available the large resources of interconnected power, electricity reduces local singularity, breaks down isolation, and makes available to all communities, in some degree, the advantages of the most favored. The effect of the large-scale provision of electric power, over the course of many years, is likely to be in the direction of spreading out and evening up the regional development."

Section four sets forth "The Value of Electric Service" to the East Central territory and shows how it has played a very important part in the realization of "cheap power."

"Planning the Electrical Supply" is the subject matter for several pages of the survey. Speaking of the responsibilities of the electric industry it says, "Three important interests have always to receive consideration; the public as users of the companies' service, the investors as owners of their stocks and bonds, and the employes who actually perform the work of serving the public. By examining the grave responsibilities placed on the power companies, it may be apparent that economic studies, such as 'power surveys,' play an important part in planning for the future."

Under the heading "Interconnection with the Iron and Steel Industry," the advantages of such interconnection are pointed out thus: "The ultimate objective would be to conserve all the heat and heating agents produced in the blast furnaces and steel mills. Whatever could not be used in the mills could be converted into electric power and absorbed by the power companies. Their systems are so large and widespread that they can market all the by-product power thus produced. Any shortage of power in the mills, at any time, can be made up by the central stations, the same as two central-station companies equalize their peaks by exchanging power."

Under the caption, "Electricity for the Railroad," the survey calls attention to the fact "that power lines are practically as numerous as rail lines and touch the same places. Many of them parallel much the same routes. Central-station power can be had wherever wanted by the railroads. The problem of power supply is not as great as that of equipping the railroad right-of-way for its utilization. Power companies can prepare for the delivery of power much faster than the railroads can get ready to use it."

Other subjects discussed at length are "The Financing of Electric Service," "Interconnection of Power Companies," "Electricity for Industry," "Electricity for the Farm."

Section twelve, "The East Central Division in 1950" discusses probable population and electric energy load conditions twenty years hence.

"The population of the Division in 1920 was 9,639,700," says the survey. "By 1950 it is estimated that it will have increased to 13,240,400. The population of the territory covered by the survey was 12,799,400 in the last census. By 1950 the figure for this area will probably be 17,558,800. The populations per square mile will be 126 and 137 respectively, an increase of about 36 per cent for each in the 30-year period.

"There will be, in 1950, about 3,630,000 families in the area, nearly all of whom should be supplied with electricity and about one-seventh with electric ranges. It is estimated that the average annual residence consumption should be 850 kilowatt-hours, or 2,350 kilowatt-hours where ranges are used. The consumption per range is estimated to be about the same as today, but the other domestic uses are considered to be much greater than today. The combined result should be about 224 kilowatt-hours per capita for residence service.

"All estimates taken together indicate, for the Power Survey Territory, total annual sales for all purposes of nearly 2,600 kilowatt-hours per capita. The production will have to be more than 3,000 per capita on account of losses in transmission and distribution. The total generation will be about 53 billion kilowatt-hours or two-thirds as much as the output for the United States in 1927. The power station capacity required with the superior load factor expected at that time is 12,000,000 kilowatts or 16,000,000 horsepower. This is about half the capacity that existed in American public utility power stations at the end of 1926. All of these figures are stated more exactly in the tables."

"Present and Future," the title of section thirteen augments and amplifies the discussion in section twelve with valuable tables.

At the end of the report are a group of very useful maps covering the East Central territory and showing distribution of population (1920 and 1950), power stations in 1928 (5,000 Kw and larger), transmission lines in 1928 (66,000 V and above), trunk lines and generating centers (1950), and individual maps of the states of Ohio, Kentucky and West Virginia, showing all electric service and transmission lines.—V. W. Palen.

Standard Wiring for Electric Light and Power—1929. By H. C. Cushing.

H. C. Cushing, Jr., 15 West 55th Street, New York, N. Y. 501 pages. Price, $3.00.

THE thirty-fifth edition of Standard Wiring for Electric Light and Power is now available. This edition represents a complete revision of this standard work. The sections on illumination, which includes the Franklin Specification, the Red Seal Plan, metering, appliances and materials, all have received careful consideration and reflect the most up-to-date practices. The sections on the Red Seal Plan and illumination should be of particular value to all who are interested in adequate wiring and proper illumination. The 1928 Code, which was not approved as an American standard, has been used as a basis for the rules concerning grounding. The grounding rules in the 1928 edition of the National Electrical Code have been reconsidered, and changes have been made since the book went to press. However, the other sections mentioned above, together with a very complete set of useful tables, make the book generally worth while.—A. B. MORGAN.

OFFICERS—DIVISIONS—SECTIONS—BUREAUS—COMMITTEES—CONVENTIONS—MEETINGS—NEW MEMBERS

NATIONAL EXECUTIVE COMMITTEE

Officers

President, P. S. ARKWRIGHT
Georgia Power Co., Atlanta, Ga.

Vice-President, M. S. SLOAN
The New York Edison Co., New York, N. Y.

Vice-President, W. A. JONES
Henry L. Doherty & Co., New York, N. Y.

Vice-President, J. F. OWENS
Oklahoma Gas & Electric Co.,
Oklahoma City, Okla.

Vice-President, MARSHALL E. SAMPSELL
Central Illinois Public Service Co.,
Chicago, Ill.

Treasurer, P. S. YOUNG
Public Service Electric & Gas Co.,
Newark, N. J.

Managing Director, PAUL S. CLAPP
National Electric Light Association,
New York, N. Y.

Secretary, A. JACKSON MARSHALL
National Electric Light Association,
New York, N. Y.

Members-at-Large

(*Term expiring June 30th*, 1929)

H. T. Sands, *Ex Officio*, Electric Bond & Share Co., New York, N. Y.

C. L. COLLENS, Reliance Electric & Manufacturing Co., Cleveland, Ohio

G. E. CULLINAN, Graybar Electric Co., Inc., New York, N. Y.

E. W. LLOYD, Commonwealth Edison Co., Chicago, Ill.

HARRY REID, National Electric Power Co., New York, N. Y.

JAMES R. STRONG, Tucker Electrical Construction Co., New York, N. Y.

(*Term expiring June 30th*, 1930)

D. C. BARNES, Stone & Webster, Inc., Boston, Mass.

H. P. LIVERSIDGE, The Philadelphia Electric Co., Philadelphia, Pa.

GERARD SWOPE, General Electric Co., New York, N. Y.

(*Term expiring June 30th*, 1931)

JOHN P. COGHLAN, Pacific Gas & Electric Co., San Francisco, Cal.

H. M. EDWARDS, The New York Edison Co., New York, N. Y.

E. M. HERR, Westinghouse Electric & Manufacturing Co., New York, N. Y.

National Section Chairmen

Accounting—JOHN F. FORD, The Philadelphia Electric Co., Philadelphia, Pa.

Commercial—MARSHALL E. SAMPSELL, Central Illinois Public Service Co., Chicago, Ill.

Engineering—E. C. STONE, Duquesne Light Co., Pittsburgh, Pa.

Public Relations—J. F. OWENS, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

Geographic Division Presidents

Canadian—P. S. GREGORY, Shawinigan Water & Power Co., Montreal, Canada

Eastern—F. R. PHILLIPS, Duquesne Light Co., Pittsburgh, Pa.

East Central—C. S. MACCALLA, Pennsylvania-Ohio Power & Light Co., Youngstown, Ohio

Great Lakes—J. E. JOHNSON, Illinois Power & Light Corp., Chicago, Ill.

Middle West—RALPH T. SMALLEY, Kansas Electric Power Co., Lawrence, Kan.

New England—IRVIN W. DAY, The Connecticut Light & Power Co., Waterbury, Conn.

North Central—L. M. PHARIS, Minnesota Power & Light Co., Duluth, Minn.

Northwest—R. M. BOYKIN, Puget Sound Power & Light Co., Seattle, Wash.

Pacific Coast—PAUL M. DOWNING, Pacific Gas & Electric Co., San Francisco, Cal.

Rocky Mountain—CLARE N. STANNARD, Public Service Co. of Colorado, Denver, Colo.

Southeastern—C. A. COLLIER, Georgia Power Co., Atlanta, Ga.

Southwestern—J. G. HOLTZCLAW, Gulf States Utilities Co., Beaumont, Tex.

PUBLIC POLICY COMMITTEE

Chairman, R. H. BALLARD, Southern California Edison Co., Los Angeles, Cal.

Vice-Chairman, W. W. FREEMAN, Columbia Gas & Electric Corp., New York, N. Y.

P. S. ARKWRIGHT, Georgia Power Co., Atlanta, Ga.

HENRY G. BRADLEE, Stone & Webster, Inc., Boston, Mass.

N. F. BRADY, The New York Edison Co., New York, N. Y.

B. C. COBB, Allied Power & Light Corp., New York, N. Y.

FRANK L. DAME, The North America Co., New York, N. Y.

J. E. DAVIDSON, Nebraska Power Co., Omaha, Neb.

HENRY L. DOHERTY, Henry L. Doherty & Co., New York, N. Y.

ALEX DOW, The Detroit Edison Co., Detroit, Mich.

CHARLES L. EDGAR, The Edison Electric Illuminating Co., Boston, Mass.

HALFORD ERICKSON, Byllesby Engineering & Management Corp., Chicago, Ill.

P. G. GOSSLER, Columbia Gas & Electric Corp., New York, N. Y.

A. R. GRAUSTEIN, International Paper Co., New York, N. Y.

FRANKLIN T. GRIFFITH, Portland Electric Power Co., Portland, Ore.

C. E. GROESBECK, Electric Bond & Share Co., New York, N. Y.

EDWIN GRUHL, The North American Co., New York, N. Y.

A. F. HOCKENBEAMER, Pacific Gas & Electric Co., San Francisco, Cal.

MARTIN J. INSULL, Middle West Utilities Co., Chicago, Ill.

SAMUEL INSULL, Commonwealth Edison Co., Chicago, Ill.

WALTER H. JOHNSON, The Philadelphia Electric Co., Philadelphia, Pa.

W. A. JONES, Henry L. Doherty & Co., New York, N. Y.

JOHN W. LIEB, The New York Edison Co., New York, N. Y.

THOMAS W. MARTIN, Alabama Power Co., Birmingham, Ala.

THOMAS N. MCCARTER, Public Service Electric & Gas Co., Newark, N. J.

JOHN B. MILLER, Southern California Edison Co., Los Angeles, Cal.

SIDNEY Z. MITCHELL, Electric Bond & Share Co., New York, N. Y.

THOMAS E. MURRAY, Thomas E. Murray, Inc., New York, N. Y.

J. J. O'BRIEN, H. M. Byllesby & Co., Chicago, Ill.

J. F. OWENS, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

R. F. PACK, Northern States Power Co., Minneapolis, Minn.

A. W. ROBERTSON, Westinghouse Electric & Manufacturing Co., New York, N. Y.

MARSHALL E. SAMPSELL, Central Illinois Public Service Co., Chicago, Ill.

H. T. SANDS, Electric Bond & Share Co., New York, N. Y.

PAUL A. SCHOELLKOPF, The Niagara Falls Power Co., Niagara Falls, N. Y.

M. S. SLOAN, The New York Edison Co., New York, N. Y.

FRANK W. SMITH, The United Electric Light & Power Co., New York, N. Y.

R. P. STEVENS, Allied Power & Light Corp., New York, N. Y.

FRANK M. TAIT, The Dayton Power & Light Co., Dayton, Ohio.

A. W. THOMPSON, West Chestnut Avenue, Chestnut Hill, Philadelphia, Pa.

GEORGE N. TIDD, American Gas & Electric Co., New York, N. Y.

HERBERT A. WAGNER, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

OWEN D. YOUNG, General Electric Co., New York, N. Y.

Public Relations National Section Representatives

JOHN F. GILCHRIST, Commonwealth Edison Co., Chicago, Ill.

T. A. KENNEY, Allied Power & Light Corp., New York, N. Y.

GUY W. TALBOT, Pacific Power & Light Co., Portland, Ore.

GEOGRAPHIC DIVISIONS STATE ASSOCIATIONS

CANADIAN DIVISION

(*Entire Dominion of Canada*)

Canadian Electrical Association

President, P. S. GREGORY, The Shawinigan Water & Power Co., Montreal, Can.; *Secretary*, H. M. LYSTER, Room 712, Power Bldg., Montreal, Can.

(*This Division Has No State* [*Provincial*] *Section*)

*EASTERN DIVISION

(*New Jersey, New York, Pennsylvania*)

President, F. R. PHILLIPS, Duquesne Light Co., Pittsburgh, Pa.; *Managing Director*, A. B. MILLAR, Telegraph Bldg., Harrisburg, Pa.

Empire State Gas and Electric Association

President, CHARLES S. RUFFNER, Mohawk-Hudson Power Corp., Albany, N. Y.; *Secretary*, CHARLES H. B. CHAPIN, 5618 Grand Central Terminal Bldg., New York, N. Y.

New Jersey Electric Association

President, C. H. HOWELL, Atlantic City Electric Co., Atlantic City, N. J.; *Secretary*, S. F. DELANY, Atlantic City Electric Co., Atlantic City, N. J.

Pennsylvania Electric Association

President, F. R. PHILLIPS, Duquesne Light Co., Pittsburgh, Pa.; *Managing Director*, A. B. MILLAR, Telegraph Bldg., Harrisburg, Pa.

EAST CENTRAL DIVISION

(*Kentucky, Ohio, West Virginia*)

President, C. S. MACCALLA, Pennsylvania-Ohio Power & Light Co., Youngstown, Ohio; *Secretary-Treasurer*, D. L. GASKILL, 603½ Broadway, Greenville, Ohio.

Kentucky Association of Public Utilities

President, SAMUEL RIDDLE, Louisville Railway Co., Louisville, Ky.; *Secretary*, E. F. KELLY, Louisville Railway Co., Louisville, Ky.

Public Utilities Association of West Virginia

President, A. C. SPURR, Wheeling Traction Co., Wheeling, W. Va.; *Secretary*, A. BLISS MCCRUM, Box 1483, Charleston, W. Va.

GREAT LAKES DIVISION

(*Illinois, Indiana, Michigan, Wisconsin*)

President, J. E. JOHNSON, Illinois Power & Light Corp., Chicago, Ill.; *Secretary*, TOM C. POLK, 910 Marquette Bldg., Chicago, Ill.

Illinois State Electric Association

President, JULIUS L. HECHT, Public Service Co. of Northern Illinois, Chicago, Ill.; *Secretary-Treasurer*, GEORGE W. SCHWANER, 205 Illinois Mine Workers Bldg., Springfield, Ill.

Indiana Electric Light Association

President, NORMAN A. PERRY, Indianapolis Power & Light Co., Indianapolis, Ind.; *Secretary-Treasurer*, WILLIAM STOKES, 1548 Consolidated Bldg., Indianapolis, Ind.

Michigan Electric Light Association Section

President, HOWARD PETT, Consumers Power Co., Jackson, Mich.; *Secretary-Treasurer*, HERBERT SYLVESTER, The Detroit Edison Co., Ann Arbor, Mich.

Wisconsin Utilities Association

President, C. R. PHENICIE, Wisconsin Public Service Corp., Green Bay, Wis.; *Executive Secretary*, JOHN N. CADBY, Room 203, University Bldg., 432 Broadway, Milwaukee, Wis.

*MIDDLE ATLANTIC DIVISION

(*To Consist of Delaware, District of Columbia, Maryland, Virginia*)

Maryland Utilities Association

President, H. T. CONNOLLY, Washington, Baltimore & Annapolis Electric Railroad Company, Baltimore, Md.; *Secretary*, D. E. KINNEAR, United Railways & Electric Company, Baltimore, Md.

Public Utilities Association of Virginia

President, A. W. HIGGINS, Virginia Public Service Co., Charlottesville, Va.; *Secretary*, A. B. TUNIS, 301 East Grace Street, Richmond, Va.

Middle West Division

(Iowa, Kansas, Missouri, Nebraska)

President, Ralph T. Smalley, Kansas Electric Power Co., Lawrence, Kan.; *Managing Director*, Thorne Browne, 1527 Sharp Bldg., Lincoln, Neb.

Iowa Section

President, C. S. Macy, Iowa Power & Light Co., Adel, Iowa; *Secretary-Treasurer*, H. E. Weeks, Tri-City Railway & Light Co., Davenport, Iowa.

Kansas Section

President, Frank M. Stone, Kansas Utilities Co., Fort Scott, Kan.; *Secretary*, H. Lee Jones, 820 Kansas Avenue, Topeka, Kan.

Missouri Association of Public Utilities

President, A. E. Reynolds, Springfield Gas & Electric Co., Springfield, Mo.; *Secretary-Treasurer*, F. D. Beardslee, 315 North Twelfth Street, St. Louis, Mo.

Nebraska Section

President, C. W. Amidon, Central Power Co., Grand Island, Neb.; *Managing Director*, Thorne Browne, 1527 Sharp Bldg., Lincoln, Neb.

New England Division

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)

President, Irvin W. Day, The Connecticut Light & Power Co., Waterbury, Conn.; *Secretary*, Miss O. A. Bursiel, Room 1113 Statler Bldg., 20 Providence Street, Boston, Mass.

(This Division Has No State Sections)

North Central Division

(Minnesota, North Dakota, South Dakota)

North Central Electric Association

President, L. M. Pharis, Minnesota Power & Light Co., Duluth, Minn.; *Secretary*, John W. Lapham, 803-804 Plymouth Bldg., Minneapolis, Minn.

(This Division Has No State Sections)

Northwest Division

(Alaska, Idaho, Montana, Oregon, Utah, Washington)

Northwest Electric Light and Power Association

President, R. M. Boykin, Pudget Sound Power & Light Co., Seattle, Wash.; *Secretary*, Berkeley Snow, Room 1206, Spaulding Bldg., Portland, Ore.

(This Division Has No State Sections)

Pacific Coast Division

(Arizona, California, Hawaii, Nevada, Philippine Islands)

Pacific Coast Electrical Association

President, Paul M. Downing, Pacific Gas & Electric Co., San Francisco, Cal.; *Secretary*, Samuel H. Taylor, Suite 729-730, 447 Sutter Street, San Francisco, Cal.

Arizona Utilities Association

President, M. A. Pooler, Tucson Gas, Electric Light & Power Co., Tucson, Ariz.; *Secretary*, L. C. McCullough, 134 South Central Avenue, Phoenix, Ariz.

Rocky Mountain Division

(Colorado, New Mexico, Wyoming)

President, Clare N. Stannard, Public Service Co. of Colorado, Denver, Colo.; *Secretary*, O. A. Weller, Public Service Co. of Colorado, Denver, Colo.

The Colorado Utilities Association

President, V. L. Board, Public Service Co. of Colo., Denver, Colo.; *Secretary*, O. A. Weller, Public Service Co. of Colo., Denver, Colo.

New Mexico Utilities Association

President, W. W. Nielsen, New Mexico Power Co., Santa Fe, N. M.; *Secretary-Treasurer*, Bernard L. Wiles, Albuquerque Gas & Electric Co., Albuquerque, N. M.

Wyoming Utilities Association

President, W. D. Johnstone, Mountain States Power Co., Casper, Wyo.; *Secretary*, F. A. Probst, Mountain States Telephone & Telegraph Co., Casper, Wyo.

Southeastern Division

(Alabama, Cuba, Florida, Georgia, North Carolina, South Carolina, Tennessee, Porto Rico)

President, C. A. Collier, Georgia Power Co., Atlanta, Ga.; *Secretary*, C. M. Kilian, 207-8 Bona Allen Bldg., Atlanta, Ga.

Southwestern Division

(Arkansas, Louisiana, Mississippi, Oklahoma, Texas)

President, J. G. Holtzclaw, Gulf States Utilities Co., Beaumont, Tex.; *Secretary*, S. J. Ballinger, San Antonio Public Service Co., San Antonio, Tex.

Arkansas Utilities Association

President, W. E. Bann, Southwestern Gas & Electric Co., Texarkana, Tex.; *Secretary*, R. I. Brown, Arkansas Central Power Co., Little Rock, Ark.

Mississippi Electric League

President, A. H. Jones, Jones-Johnson Co., McComb, Miss.; *Secretary*, A. R. Riddick, A. G. Riddick, Inc., Jackson, Miss.

Oklahoma Utilities Association

President, L. W. Scherer, United Telephone Corp., Watonga, Okla.; *Secretary*, Edward F. McKay, 1020 Petroleum Bldg., Oklahoma City, Okla.

Southwestern Public Service Association

President, W. H. Burke, Stone & Webster, Inc., Houston, Tex.; *Secretary*, E. N. Willis, 403 Slaughter Bldg., Dallas, Tex.

***Note: This Division is in Process of Formation.**

SECTIONS, BUREAUS AND COMMITTEES

Chairmen's names only listed here

Special National Committees

Advertising Committee—Frank Leroy Blanchard, Henry L. Doherty & Co., New York, N. Y.

Charles A. Coffin Prize Committee—P. S. Arkwright, Georgia Power Co., Atlanta, Ga.

Codes and Standards Committee—Irvin W. Day, The Connecticut Light & Power Co., Waterbury, Conn.

Constitution and By-Laws Committee—R. F. Pack, Northern States Power Co., Minneapolis, Minn.

Electrification of Steam Railroads Committee—Britton I. Budd, Public Service Co. of Northern Illinois, Chicago, Ill.

Exhibition Committee—E. W. Goldschmidt, Wagner Electric Corp., New York, N. Y.

Finance Committee—Sidney Z. Mitchell, Electric Bond & Share Co., New York, N. Y.

Lamp Committee—Frank W. Smith, The United Electric Light & Power Co., New York, N. Y.

Prize Awards Committee—W. H. Onken, Jr., *Electrical World*, New York, N. Y.

Public Policy Committee—R. H. Ballard, Southern California Edison Co., Los Angeles, Cal.

Rate Research Committee—L. R. Nash, Stone & Webster, Inc., Boston, Mass.

Water Power Development Committee—Paul A. Schoellkopf, The Niagara Falls Power Co., Niagara Falls, N. Y.

Wiring Policy Committee—J. E. Davidson, Nebraska Power Co., Omaha, Neb.

General National Committees

***Civic Development Committee**—John B. Reynolds, Middle West Utilities Co., Chicago, Ill.

***Educational Committee**—Fred R. Jenkins, Commonwealth Edison Co., Chicago, Ill.

***Insurance Committee**—W. H. Sawyer, Allied Power & Light Co., New York, N. Y.

***Membership Committee**—Howard K. Mohr, The Philadelphia Electric Co., Philadelphia, Pa.

***Rural Electric Service Committee**—Charles F. Stuart, Northern States Power Co., Minneapolis, Minn.

Accounting National Section

***Section's Executive Committee**—J. F. Ford, The Philadelphia Electric Co., Philadelphia, Pa.

Budget Committee—B. S. Rodey, Jr., The United Electric Light & Power Co., New York, N. Y.

***Classification of Accounts Committee**—H. C. Hasbrouck, H. C. Hopson & Co., New York, N. Y.

Corporate Finance Committee—O. E. McCormick, Middle West Utilities Co., Chicago, Ill.

***Customers' Records Committee** — Douglas Brown, New York & Queens Electric Light & Power Co., Long Island City, N. Y.

***Fixed Capital Committee**—J. A. Rockwood, Portland Electric Power Co., Portland, Ore.

***General Records Committee**—K. B. Crumb, American Gas & Electric Co., New York, N. Y.

***Purchasing and Storeroom Committee**—W. G. Young, New York & Queens Electric Light & Power Co., Long Island City, N. Y.

***Statistics Committee**—Harry A. Snow, The Detroit Edison Co., Detroit, Mich.

Commercial National Section

***Section's Executive Committee**—Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

***Commercial and Industrial Power and Heating Bureau**—V. M. F. Tallman, Charles H. Tenney & Co., Boston, Mass.

Commercial Cooking Committee—O. Wilhelmy, The Union Gas & Electric Co., Cincinnati, Ohio.

Electric Truck Committee—Guy W. Thomas, Public Service Co. of Colorado, Denver, Colo.

General Power Committee—H. C. Thuerk, Erie Lighting Co., Erie, Pa.

Industrial Heating Committee—J. L. Faden, The Edison Electric Illuminating Co., Boston, Mass.

***Lighting Bureau**—T. O. Kennedy, The Ohio Public Service Co., Cleveland, Ohio.

Commercial and Industrial Lighting Committee—J. Daniels, The Edison Electric Illuminating Co., Boston, Mass.

Electrical Advertising Committee—C. J. Eaton, Middle West Utilities Co., Chicago, Ill.

Home Lighting Committee—W. T. Blackwell, Public Service Electric & Gas Co., Newark, N. J.

Street Lighting Committee—R. J. Malcomson, Public Service Co. of Northern Illinois, Chicago, Ill.

***Merchandising Bureau**—Frank D. Pembleton, Public Service Electric & Gas Co., Newark, N. J.

Domestic Electric Range Committee—F. A. Coupal, Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.

Merchandise Sales Committee—C. L. Harold, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

Refrigeration Committee—C. L. Dunn, The Ohio Public Service Co., Cleveland, Ohio.

Water Heating Committee—Norman T. Wilcox, Stone & Webster, Inc., Boston, Mass.

***Customer Relations Committee**—H. T. East, Public Service Co. of Northern Illinois, Chicago, Ill.

Promotional Rates Committee—E. W. Lloyd, Commonwealth Edison Co., Chicago, Ill.

***Wiring Sales Committee**—A. P. Good, Commonwealth Edison Co., Chicago, Ill.

Engineering National Section

***Section's Executive Committee**—E. C. Stone, Duquesne Light Co., Pittsburgh, Pa.

***Accident Prevention Committee**—C. R. Beardsley, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

***Electrical Apparatus Committee**—J. A. Johnson, The Niagara Falls Power Co., Niagara Falls, N. Y.

Engineering Administration Committee—H. P. Liversidge, The Philadelphia Electric Co., Philadelphia, Pa.

***Hydraulic Power Committee**—Byron E. White, Utica Gas & Electric Co., Utica, N. Y.

***Inductive Coordination Committee**—H. L. Wills, Georgia Power Co., Atlanta, Ga.

***Meter Committee**—E. E. Hill, The New York Edison Co., New York, N. Y.

***Overhead Systems Committee**—Harold Cole, The Detroit Edison Co., Detroit, Mich.

***Power System Engineering Committee**—L. W. W. Morrow, *Electrical World*, New York, N. Y.

***Prime Movers Committee**—E. B. Ricketts, The New York Edison Co., New York, N. Y.

Special Engineering Research Committee—C. F. Hirshfeld, The Detroit Edison Co, Detroit, Mich.

***Underground Systems Committee**—J. W. Sylvester, The Philadelphia Electric Co., Philadelphia, Pa.

PUBLIC RELATIONS NATIONAL SECTION

***Section's Executive Committee**—J. F. OWENS, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

***Cooperation with Educational Institutions**—CARL D. JACKSON, 36 West 44th Street, New York, N. Y.

***Customer Ownership**—W. H. HODGE, Byllesby Engineering & Management Corp., Chicago, Ill.

***Industrial Relations Committee**—HOMER E. NIESZ, Commonwealth Edison Co., Chicago, Ill.

***Information Bureau Organizations Committee**—T. A. KENNEY, Allied Power & Light Corp., New York, N. Y.

Manufacturers' Advertising Committee—T. J. MCMANIS, General Electric Co., Schenectady, N. Y.

***Public Speaking Committee**—W. S. VIVIAN, Middle West Utilities Co., Chicago, Ill.

***Relations with Financial Institutions Committee**—A. W. ROBERTSON, Westinghouse Electric & Manufacturing Co., New York, N. Y.

***Women's Committee**—MISS SOPHIA MALICKI, Middle West Utilities Co., Chicago, Ill.

***Provision is made for a representative from each Geographic Division.**

CONVENTIONS AND MEETINGS

Meeting of the Section, Bureaus and Committees of the National Electric Light Association are shown in roman type; those of other associations in italics

1929

April

1–2 Industrial Heating Conference, Great Lakes Power Club, University of Michigan, Ann Arbor, Mich.

3 *New York Electrical Society, New York, N. Y.*

5 Commercial Section, Great Lakes Geographic Division, Detroit, Mich.

12 Maryland Utilities Association, Emerson Hotel, Baltimore, Md.

4–13 *Home Complete Exposition, Indiana State Fair Grounds, Indianapolis, Ind.*

17–18 *National Warm Air Heating and Ventilating Association, Indianapolis, Ind.*

17–19 Engineering Section, Pacific Coast Geographic Division, Fresno, Cal.

18–20 Engineering Section, Great Lakes Geographic Division, Drake Hotel, Chicago, Ill.

18–20 Arizona Utilities Association, Tucson, Ariz.

21–23 *American Society of Civil Engineers, Dallas, Texas.*

22–26 *American Welding Society, Engineering Societies Bldg., New York, N. Y.*

24–26 Middle West Geographic Division, Hotel Fontenelle, Omaha, Neb.

29–30 *Chamber of Commerce of the U. S. A., Washington, D. C.*

30 Southwestern Geographic Division, Hot Springs, Ark.

30 Arkansas Utilities Association, Hot Springs, Ark.

May

2 *American Trade Association Executives, Mayflower Hotel, Washington, D. C.*

1–3—Southwestern Geographic Division, Hot Springs, Ark.

1–3 Arkansas Utilities Association, Hot Springs, Ark.

1–3 *Chamber of Commerce of the U. S. A., Washington, D. C.*

1–3 *Indiana Public Utilities Association, Hotel Gary, Gary, Ind.*

1–3 Indiana Electric Light Association, Hotel Gary, Gary, Ind.

1–3 *Indiana Gas Association, Hotel Gary, Gary, Ind.*

7–9 *American Institute of Electrical Engineers, Regional Meeting, Dallas, Texas.*

7–10 East Central Geographic Division, Brown Hotel, Louisville, Ky.

8–10 Southeastern Geographic Division, Asheville, N. C.

13–15 *American Society of Mechanical Engineers, Rochester, N. Y.*

13–16 *National Fire Protection Association, Memphis, Tenn.*

13–16 *National Fire Protection Association, Memphis, Tenn.*

13–24 Industrial Heating School, Case School of Applied Science, Cleveland, Ohio.

20–25 *National Electrical Manufacturers Association, The Homestead, Hot Springs, Va.*

27–31 *National Electrical Wholesalers Association, The Homestead, Hot Springs, Va.*

27–31 *General Federation of Women's Clubs, Swampscott, Mass.*

31 Commercial Section, Great Lakes Geographic Division, Indianapolis, Ind.

June

3–7 Annual Convention and Exhibition, NATIONAL ELECTRIC LIGHT ASSOCIATION, Municipal Auditorium, Atlantic City, N. J.

10–15 *Westinghouse Agent-Jobber's Association, The Homestead, Hot Springs, Va.*

14 *Board of Directors, Society for Electrical Development, New York, N. Y.*

16–18 North Central Geographic Division, Breezy Point Summer Resort, Pequot, Minn.

18–21 *Society of Automotive Engineers, New York, N. Y.*

19–21 Canadian Geographic Division, Algonquin Hotel, St. Andrews-by-the-Sea, N. B.

19–22 Pacific Coast Geographic Division, Del Monte, Cal.

20–21 Accounting Section, Wisconsin Utilities Association, Sheboygan, Wis.

24–28 *American Society for Testing Material, Atlantic City, N. J.*

24–28 *American Institute of Electrical Engineers, Swampscott, Mass.*

26–29 Northwest Geographic Division, Seattle, Wash.

July

1–4 *American Society of Mechanical Engineers, Salt Lake City, Utah*

1–5 *American Home Economics Association Convention and Exhibition, Statler Hotel, Boston, Mass.*

18–19 Electric Section, Wisconsin Utilities Association, Hotel Wausau, Wausau, Wis.

August

27–30 *National Association of Railroad and Utilities Commissioners, Glacier National Park Hotel, Glacier National Park, Mont.*

September

4–6 Pennsylvania Electric Association, Bedford Springs Hotel, Bedford Springs, Pa.

9–11 Rocky Mountain Geographic Division Hotel Colorado, Glenwood Springs, Colo.

9–12 New England Geographic Division, Hotel Griswold, New London, Conn.

9–13 *American Society for Steel Treating, Cleveland, Ohio.*

19–20 Empire State Gas and Electric Association, Saranac Inn, Saranac Lake, N. Y.

28–30 *American Electric Railway Association Convention and Exhibit, Atlantic City Auditorium, Atlantic City, N. J.*

30 *National Safety Council, Stevens Hotel, Chicago, Ill.*

October

1–4 *American Electric Railway Association Convention and Exhibit, Atlantic City Auditorium, Atlantic City, N. J.*

1–4 *National Safety Council, Stevens Hotel, Chicago, Ill.*

14–18 *American Gas Association, Atlantic City, N. J.*

NEW MEMBERS

Electric Light and Power Companies (Class A)

Colorado, Denver, The Arvada Electric Company

Colorado, Springfield, Highland Utilities Company

Illinois, Chicago, North Continent Utilities Corporation

Maine, Lewiston, Androscoggin Electric Company

Minnesota, Elk River, Elk River Power & Light Company

Montana, Great Falls, Great Northern Utilities Company

Nebraska, Scottsbluff, Missouri Service Company

New Mexico, Socorro, New Mexico Public Service Company

Pennsylvania, Oil City, Keystone Public Service Company

Pennsylvania, Waterford, Waterford Electric Light Co.

Vermont, Chester, Chester Power & Light Co., Inc.

Vermont, Pittsford, Allied Vermont Utilities, Inc.

Canada, St. John New Brunswick, St. John River Power Company

Canada, Sask., Regina, Dominion Electric Power, Limited

Employees of Electric Light and Power Companies (Class B)

Alabama, Birmingham, Alabama Power Company
- W. E. Baldwin
- Mrs. Jessie M. Hunter (Montgomery, Ala.)

California, Los Angeles, Los Angeles Gas & Elec. Corp.
- C. B. Heisler (Alhambra, Calif.)
- William B. Hickok
- Frank H. Streit (So. Pasadena, Calif.)

California, San Francisco, Pacific Gas & Electric Co.
- Alfred Anderson
- James S. Bunnell (Sacramento, Calif.)
- Robert Grutzmacher
- C. E. Haglund (Emeryville, Calif.)
- E. R. McNee
- William C. Macy
- W. H. Park

California, San Francisco, Peoples California Hydro-Electric Corp.
- Frank E. Bregdon (Fort Bragg, Calif.)
- Paul Madison (Fort Bragg, Calif.)

Colorado, Denver, Public Service Company of Colorado
- V. M. McDonald (Leadville, Colo.)
- Henry A. Mitchell

Colorado, Springfield, Highland Utilities Company
- F. A. Hadel
- Thos. White (Farmington, New Mexico)

Delaware, Wilmington, Delaware Power & Light Company
- G. W. Cannon

Idaho, Boise, Idaho Power Company
- Elmer G. Adams
- Roy Calhoun (Jerome, Idaho)
- L. H. Hoppes (Jerome, Idaho)
- A. W. Jacomini (Shoshone, Idaho)
- H. H. Kerfoot (Hazelton, Idaho)
- F. H. Pollard (Wendell, Idaho)
- Lee Pursley (Jerome, Idaho)
- A. A. Woodhead (Gooding, Idaho)

Illinois, Chicago, Commonwealth Edison Company
- Miss Margaret A. Regan

Illinois, Chicago, North Continent Utilities Corporation
- W. A. Baehr
- William B. Baehr
- E. R. Foster
- R. B. Meredith
- J. W. Sykes
- A. C. Winters

Illinois, East St. Louis, East St. Louis Light Light & Power Co.
- Miss Ida M. Spies

Illinois, Peoria, Central Illinois Light Co.
- Henry E. Brickner
- T. F. Steenrod (E. Peoria, Ill.)

Iowa, Cedar Rapids, Iowa Railway & Light Corporation
- Miss Louise Hathaway

Iowa, Fort Dodge, Fort Dodge Gas & Electric Company
- Mark Anderson

Iowa, Mason City, Peoples Gas and Electric Company of Oswego
- Fred W. Hanley (Oswego, N. Y.)

Iowa, Sioux City, McGraw Electric Company
John A. Martin (Minneapolis, Minn.)

Kansas, Lawrence, Kansas Electric Power Company
M. C. Blackstun (Bonner Springs, Kansas)
A. W. Johnson (Leavenworth, Kansas)

Louisiana, New Iberia, Gulf Public Service Company
Clifford J. Schexnayder

Maine, Portland, Cumberland County Power & Light Company
Miss Frances E. Googins (Biddeford, Maine)
Miss Estelle R. MacElveny

Massachusetts, Boston, New England Power Company
Howard A. Hands
R. E. Shillady
Walter A. Sutphen

Massachusetts, Boston, Charles H. Tenney & Co.
James B. Arthur
Ambrose L. Kerrigan
Donald B. McGuire (Melrose, Mass.)

Massachusetts, Cambridge, Cambridge Electric Light Company
Carl M. Glidden (Waverly, Mass.)

Massachusetts, Haverhill, Haverhill Electric Company
H. S. Brasseur

Massachusetts, Lawrence, Lawrence Gas & Electric Co .
George Frost
Maurice Johnson
E. G. Twohey

Massachusetts, Revere, Suburban Gas & Electric Company
William J. Conners

Michigan, Detroit, The Detroit Edison Company
B. S. Aldrich
J. S. Ambrose
H. M. Armstrong
F. N. Baker (Port Huron, Mich.)
E. A. Baldwin
N. Ballbach
M. A. Barbour
F. J. Barnes
V. S. Barretta (Wyandotte, Mich.)

Michigan, Detroit, The Detroit Edison Company
C. H. Bay
F. W. Benstein
C. H. Best (Port Huron, Mich.)
N. Bowman
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THE PRESIDENT'S PAGE

Convention

EVENTS are transpiring which should make our Fifty-second Convention and Exhibition the most colorful, entertaining, and valuable of any that have ever been held.

Atlantic City is preparing a great celebration to mark the inauguration of Light's Golden Jubilee in honor of Mr. Edison and the Fiftieth Anniversary of the invention of the practical incandescent lamp, and, as a compliment to the electrical industry, the formal opening of the Atlantic City Auditorium will be on May 31st to coincide with the opening of our Exhibition. In these exercises such eminent figures as Vice-President Curtis, Sir Esme Howard, British Ambassador, and Don Alejandro Padilla y Bell, Spanish Ambassador, will take part.

The Exhibition will be by far the largest ever held. It will be located in an ideal setting, filling the entire floor space and stage of the mammoth main hall of the Auditorium.

Distinguished speakers who are leaders in their fields will discuss the subjects of greatest and immediate importance to the electrical industry and to the general public.

On this occasion the industry will pledge anew its obligations to civilization.

Not alone will the executives of our member companies benefit from attendance and participation in the convention, but so will every employee who may have the opportunity to attend.

Without doubt every higher executive who can possibly make his arrangements to attend will be there, but it is for the younger men and women that I wish to make a special plea. None can attend without returning to his duties with a broadened vision of the greatness of the work he is engaged in, his personal obligations to it, and his and the industry's duties to the Commonwealth. In addition he will carry away information of tangible value in the efficient administration of his work.

Every member company is urged to have at the Convention as strong a representation as is possible.

P S Arkwright
President.

N·E·L·A· BULLETIN

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Science and the machine, in brief, are not things toward which any of us can afford to take a snooty attitude.—*Henry Hazlitt.*

"What a man does for himself dies with him; what he does for his community lives forever."

How You May Help

WHILE the collateral events of the Convention, including the Exhibition, Atlantic's City's celebration of her Diamond Jubilee, the initial festivities of Light's Golden Jubilee, and the varied entertainment provided for Convention delegates, will be much greater than at any previous convention, they will be so arranged that they will not conflict with the Business Sessions.

The morning sessions will convene promptly at 10 o'clock, the afternoon sessions at 3 o'clock, and the Public Policy Session on Thursday morning at 8.30 o'clock. As these sessions will be called to order promptly at the hours stated, the cooperation of delegates in seating themselves a few moments before the meetings are called to order so that the first speaker of each session may not be disturbed by late comers will be greatly appreciated by the Convention Committee. Such thoughtfulness will greatly aid in the effective discharge of our Business Program and make for a thoroughly successful convention.

In this issue of the Bulletin are a number of articles that should be read by everyone who expects to attend the Convention. There is a general article which briefly outlines the main events of the Convention and Exhibition, tells of the speakers on the Business Program and gives other information that will be useful to the delegate.

C. H. Howell, General Manager of the Atlantic City Electric Company, writes entertainingly of the part the city will play in the Convention, while the Bulletin's philosopher, The Amplifier, will help create a proper frame of mind to get the most enjoyment and benefit from the Convention. The invitation to a convention of the 90's, which was culled from our records, will no doubt bring up many bright memories to our older members, and give to the younger ones a glimpse of life in less hurried days.

Power Distribution

A DETAILED analysis of the distribution of the power produced by the electric utility enterprises is of interest as emphasizing the part played by industrial and commercial electrification in the disposal of the country's energy supply. Eliminating those power houses whose output is devoted entirely to railway use, the output of the electric light and power plants may be divided roughly as follows:

	Per cent
Sold for domestic service	10
Sold for commercial light	7½
Sold for commercial power	56
Sold for traction	6½
Total sold	80
Used by company itself (a)	3½
Lost and unaccounted for	16½
Total generated, plus procured from enterprises not public utilities and imported from Canada	100

Note (a)—Used in the gas, water or traction departments of companies operating composite enterprises and for lighting companies' offices, etc.

It is thus evident that industrial power is the preponderating item in the disposition of the output of the electric power houses, and future plans, as well as present characteristics, will be predicated to a great extent upon the future developments, not of the electric light and power industry itself, but of the manufacturers of the nation.

Historically speaking, the initial purpose of electric service was for light and traction. Both of these have the unfortunate habit of having the same peak hour. The result was the formation of a period of maximum demand between five and six o'clock, and this demand determined the amount of generating machinery installed. The net result was that much of this installed machinery was idle for all but a small part of the day. In cities where commerce and trade—as distinguished from what is usually termed "heavy manufacture" — predominate, the type of curve which represents this situation still persists.

Here we find it rising sharply as the day's work begins, a little peak in the forenoon when all factories are working, a slight drop during the lunch hour, a rise again during the afternoon, with a sudden and dizzy height at five o'clock when the store and home lights are turned on and the traction lines begin to cope with the evening rush hour. This consolidated curve constitutes the most pronounced instance of the "five o'clock peak," and its shape has an important bearing upon the possible competition of water power with steam generated electricity.

On the other hand, in those communities where manufacturing predominates, the curve is quite different.

The peak no longer comes at five o'clock with the turning on of lights; it may come between nine and ten o'clock in the morning or between two and three in the afternoon. Where electrolytic or electro-metallurgical loads have been built up, it even tends to approximate a straight line.

N·E·L·A·
BULLETIN

May, 1929 Vol. XVI No. 5

The 52nd Convention and Exhibition

Several Other Celebrations in Atlantic City Will Add to Its Interest

THE 52nd Convention of the National Electric Light Association, beginning Monday, June 3, and lasting through Friday, June 7, will furnish a grand climax for several other related events to be held in Atlantic City.

The Exhibition, to be held in conjunction with the Convention, opens Friday, May 31; the dedication ceremonies of the Atlantic City Auditorium—where the Convention and Exhibition will be held—will be on May 31; and the initial celebrations of Light's Golden Jubilee, as well as festivities marking the Diamond Jubilee of Atlantic City, will take place convention week. Each of these events, separately, would attract great crowds to the seaside resort, but taken together they are expected to strain the capacity of Atlantic City's hotels.

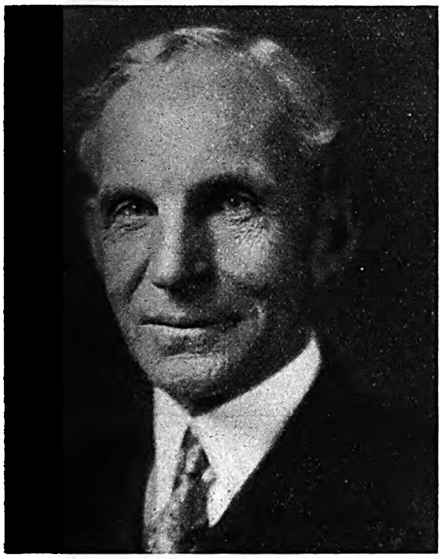
At the business sessions of the Convention, on which a great deal of time and thought have been placed, men who have won distinction in other fields of endeavor will be heard, as well as those of outstanding prominence in the electrical industry. Among the subjects that will be in the forefront for discussion are regulation, industrial development, research, rate making, commercial opportunities, accounting practices of the utilities, public relations, engineering developments, and the Federal Trade Commission's investigation of the electrical industry.

P. S. ARKWRIGHT

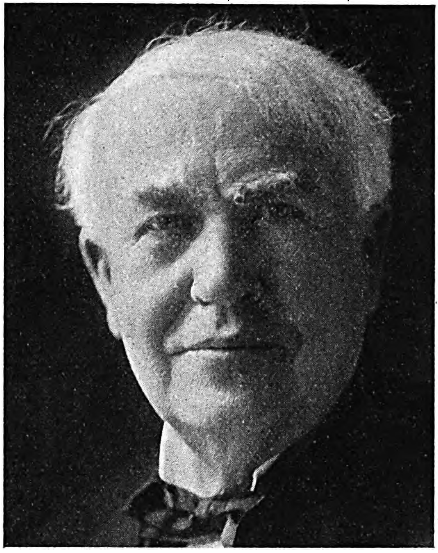
President, National Electric Light Association

Among those who will take part in the program are: Preston S. Arkwright, President of the N. E. L. A.; Julius H. Barnes, former President of the United States Chamber of Commerce; W. W. Freeman, President of the Union Gas and Electric Company; George D. Gibbs, Gibbs and Hill; J. J. Carty, Vice-President, American Telephone and Telegraph Co.; W. J. Hagenah, Vice-President, Byllesby Engineering and Management Corporation; A. W. Robertson, Chairman of the Board, Westinghouse Electric and Manufacturing Co.; J. F. Owens, Chairman of Public Relations National Section N. E. L. A.; R. F. Pack, former President of the N. E. L. A.; Paul S. Clapp, Managing Director of the N. E. L. A.; Britton I. Budd, President of the Public Service Co. of Northern Illinois; E. C. Stone, Chairman of the Engineering National Section, N. E. L. A.; Marshall E. Sampsell, Chairman of the Commercial National Section, N. E. L. A.; M. S. Sloan, President of the New York Edison Co.; E. W. Goldschmidt, Chairman of the Exhibition Committee; W. H. Onken, Jr., Senior Editor of the *Electrical World;* John W. Lieb, Vice-President of the New York Edison Co.; Charles L. Edgar, President of the Edison Electric Illuminating Co. of Boston; Thomas N. McCarter, President of the Public Service and Gas Co.; Berton Braley, author and poet; J. F. Ford, Chairman of the Accounting National Section, N. E. L. A.; J. R. Howard, past President of the American Farm Bureau Federation; J. L. Madden, Vice-President of the Metropolitan Life Insurance Co.; W. L. Ransom, of Whitman, Ransom, Coulson & Goetz; Bernard F. Weadock, Special Counsel before the Federal Trade Commission; A. C. Marshall, Vice-President of the Detroit Edison Co.; F. R. Phillips, President of the Duquesne Light Co.; B. C. Forbes, editor of *Forbes Magazine.*

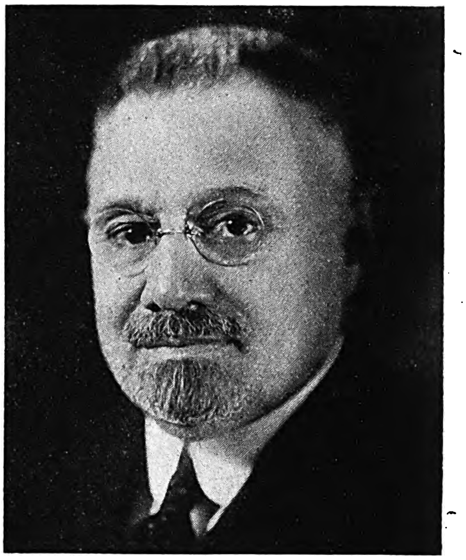
The general session for Thursday will be in the nature of a tribute from the industry to Thomas A. Edison. Mr. Edison is expected to appear both in



HENRY FORD
Ford Motor Car Company



THOMAS A. EDISON
Citizen of the U. S. A.



JOHN W. LIEB
Vice-President, New York Edison Company

person and in a talkie-movie. Henry Ford will also be on the speakers' platform to do honor to Mr. Edison. Messrs. Charles L. Edgar, Thomas N. McCarter, John W. Lieb and Berton Braley will be the principal speakers at this session.

The reader is referred to the program on page 266, and the Convention and Exhibition Calendar on page 272 for more complete details of the Convention.

Each delegate to the Convention will be provided with a business and entertainment program, Convention badge and a guide to the Exhibition upon registration. The registration booth will be at the entrance of the Atlantic City Auditorium.

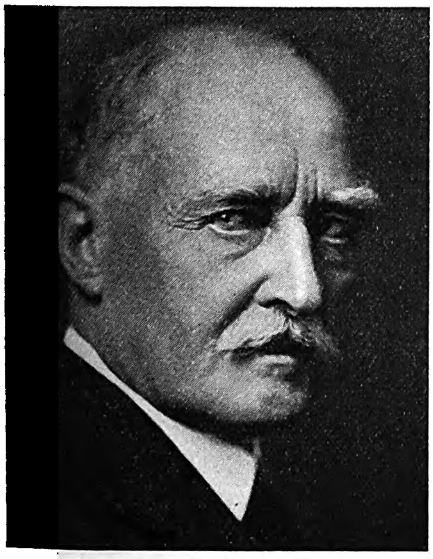
The Exhibition will be the largest and most complete that has ever been held. Opening May 31, three days in advance of the Convention, the Exhibition will provide an unparalleled display of electrical apparatus and appliances.

The entertainment program includes a reception to President and Mrs. Arkwright to be held on Monday evening, June 3. There will be dancing every evening in the magnificent ballroom of the Auditorium. On Wednesday evening special entertainment features will be interspersed with the dancing. The B. A. Rolfe Orchestra will provide the music throughout the Convention, both for dancing and for other occasions. Frieda Hempel, soprano, and Albert Spaulding, violinist, will entertain at the Public Policy Session, Thursday night.

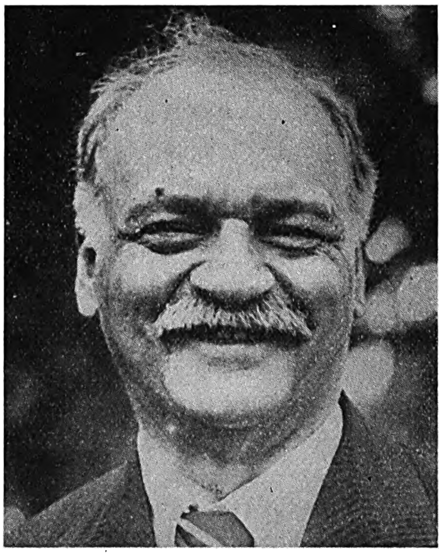
Entertainment for the ladies attending the Convention will include a golf tournament at Seaview Golf Club on Tuesday, June 4, and a card party on Wednesday afternoon, at the Hotel Chelsea.

Vice-President of the United States Curtis, together with Sir Esme Howard, the British Ambassador and dean of the diplomatic corps at Washington, and Don Alejandro Padilla y Bell, the Spanish Ambassador, will take part in the formal dedication and opening of the Atlantic City Auditorium on the evening of May 31. President Arkwright of the Association will have a prominent place in the dedication ceremonies.

The Navy Department, according to Senator Walter E. Edge of New Jersey, has ordered the battleship Wyoming, flagship of the nation's fleet and



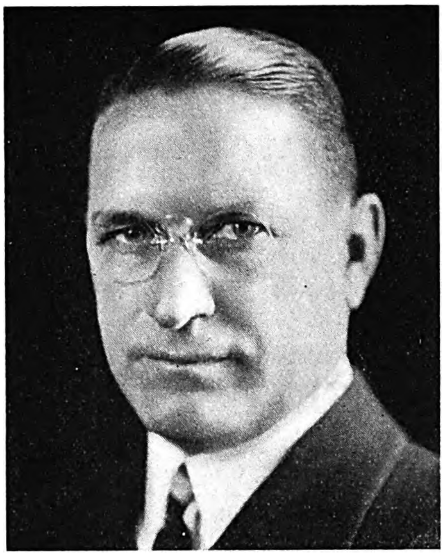
SIR ESME HOWARD
British Ambassador to U. S. A.



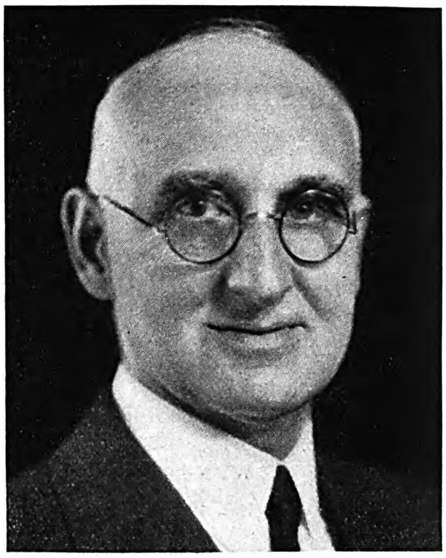
CHARLES F. CURTIS
Vice-President of U. S. A.

DON ALEJANDRO PADILLA Y BELL
Spanish Ambassador to U. S. A.

PAUL S. CLAPP
Managing Director, National Electric Light Association



M. S. SLOAN
Vice-President, National Electric Light Association



P. S. YOUNG
Treasurer, National Electric Light Association

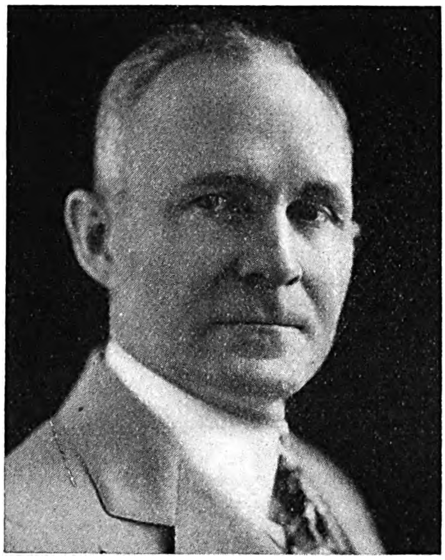
one of the most formidable battle craft afloat, to cruise up and down the coast on the evenings of May 31 and June 1 to engage in a searchlight drill, playing brilliant beams on the dirigible Los Angeles as she floats overhead.

The Vice-President will be accompanied, it was announced, by his sister, Mrs. Gann, while the ambassadors will be escorted by their staffs and by Senator Edge and Congressman Isaac Bacharach, together with twenty U. S. Senators and Congressmen, the entire group coming to Atlantic City in a special car leaving Washington at 12.55 p.m. on May 31.

In addition, the States will be represented by several governors, including Governor Roosevelt of New York and Governor Fisher of Pennsylvania, with Governor Larson of New Jersey as their official host.

Besides the light drill of the Wyoming and Los Angeles, aeroplanes discharging fireworks will speed up and down the coast, adding to the brilliant electrical spectacle presented by the boardwalk and entire city.

The electrical display includes a 75-foot high arch of blazing jewels spanning the boardwalk at States Avenue; an electrical fountain, showers of golden bulbs from the boardwalk standards, lighting of the surf for a mile with all the hues of the rainbow, decoration of Atlantic and Pacific Avenues, the principal municipal buildings, and all boardwalk hotels, together with lighting and decoration of the larger of the side avenue establishments.



J. F. OWENS
Chairman, Public Relations National Section

E. C. STONE
Chairman, Engineering National Section

MARSHALL E. SAMPSELL
Chairman, Commercial National Section

J. F. FORD
Chairman, Accounting National Section

Business Program for 52nd N. E. L. A. Convention, Atlantic City, N. J., June 3-7, 1929

[This Program, at time of publication in the Bulletin, is in tentative state only and will be augmented before the Convention. Slight changes may also be made in time of a few program events.]

GENERAL SESSIONS

M. S. Sloan, *Vice-Chairman*
W. A. Jones, *Vice-Chairman*
P. S. Arkwright, *Chairman*
J. F. Owens, *Vice-Chairman*
Marshall E. Sampsell, *Vice-Chairman*

FIRST GENERAL SESSION

Tuesday, June 4th, 9:45 A. M.

Meeting Room No. 1—Ballroom—Atlantic City Auditorium

9:45 Overture.
10:00 Welcome to Atlantic City.
Honorable Anthony M. Ruffu, Mayor, Atlantic City, N. J.
10:15 President P. S. Arkwright,
Georgia Power Co.,
Atlanta, Ga.
10:40 Treasurer P. S. Young,
Public Service Electric & Gas Co., Newark, N. J.
10:50 Managing Director Paul S. Clapp.
11:05 Regulation.
W. J. Hagenah, Vice-President,
Byllesby Engineering & Management Corp.,
Chicago, Ill.
11:30 (Talkie-Movie).
11:45 Public Relations National Section
J. F. Owens, Chairman,
Oklahoma Gas & Electric Co.,
Oklahoma City, Okla.
12:05 (Title of Address to be Announced).
A. W. Robertson, Chairman of Board,
Westinghouse Electric & Manufacturing Co.,
New York, N. Y.
12:30 Constitution and By-Laws Committee.
R. F. Pack, Chairman,
Northern States Power Co.,
Minneapolis, Minn.
Election — Constitutional Revision Committee.
12:35 Election — Nominating Committee.
12:40 Adjournment.

SECOND GENERAL SESSION

Wednesday, June 5th, 9:45 A. M.

Meeting Room No. 1—Ballroom—Atlantic City Auditorium

9:45 Overture.
10:00 Announce — Memorials Committee.
10:05 The 1929 Exhibition.
E. W. Goldschmidt,
Wagner Electric Corp.,
New York, N. Y.
10:15 Engineering National Section.
E. C. Stone, Chairman,
Duquesne Light Co.,
Pittsburgh, Pa.
10:35 Electrification of Railroads.
Britton I. Budd, President,
Public Service Co. of Northern Illinois,
Chicago, Ill.
10:55 Railroads and Electrification.
George D. Gibbs, Consulting Engineer,
Gibbs & Hill,
New York, N. Y.
11:20 (Movie-Talkie).
11:35 Commercial National Section.
Marshall E. Sampsell, Chairman,
Central Illinois Public Service Co.,
Chicago, Ill.
11:55 (Subject to be Announced).
M. S. Sloan, President,
The New York Edison Co.,
New York, N. Y.
12:15 Science and Progress in the Industries.
J. J. Carty, Vice-President,
American Telephone & Telegraph Co.,
New York, N. Y.
12:35 Adjournment.

THIRD GENERAL SESSION

Thursday, June 6th, 9:45 A. M.

Meeting Room No. 1—Ballroom—Atlantic City Auditorium

9:45 Overture.
10:00 Prize Awards.
W. H. Onken, Jr.,
Electrical World,
New York, N. Y.
10:15 Introduction by President P. S. Arkwright of Mr. John W. Lieb, who will preside for the remainder of the session.
10:35 (Title of Address to be Announced).
Charles L. Edgar, President,
The Edison Electric Illuminating Co., Boston, Mass.
Introduction of
Henry Ford, President,
Ford Motor Car Co.,
Detroit, Mich.
11:10 (Title of Address to be Announced).
Thomas N. McCarter, President, Public Service Electric & Gas Co., Newark, N. J.
Introduction of
Thomas A. Edison.
11:40 Thomas A. Edison.
(Talkie-Movie).
12:00 (Title of Address to be Announced).
Berton Braley, Author,
New York, N. Y.
12:30 Adjournment.

FOURTH GENERAL SESSION

Friday, June 7th, 9:45 A. M.

Meeting Room No. 1—Ballroom—Atlantic City Auditorium

9:45 Overture.
10:00 Memorials.
W. H. Onken, Jr.,
Electrical World,
New York, N. Y.
10:10 Accounting National Section.
J. F. Ford, Chairman,
The Philadelphia Electric Co.,
Philadelphia, Pa.
10:30 Rural Electrification.
J. R. Howard, Past-President,
American Farm Bureau Federation,
Clemens, Iowa.
10:55 (Talkie-Movie).
11:10 Industrial Development in the United States.
J. L. Madden, Vice-President,
Metropolitan Life Insurance Co.
New York, N. Y.
11:35 The Public Right as to Electric Rates.
W. L. Ransom,
Whitman, Ransom, Coulson & Goetz,
New York, N. Y.
12:00 Bernard F. Weadock.
Special Counsel before Federal Trade Commission, New York, N. Y.
12:25 Report—Constitutional Revision Committee.
12:30 Vote—Constitutional Amendments Proposed.
12:35 Report — Nominating Committee.
12:45 Election—Officers and Members Executive Committee.
1:00 Adjournment.

PUBLIC POLICY COMMITTEE SESSION

R. H. Ballard, *Chairman*
W. W. Freeman *Vice-Chairman*

Thursday, June 6th, 8:30 P. M.
Meeting Room No. 1—Ballroom—
Atlantic City Auditorium

8:30 B. A. Rolfe and Orchestra.

8:55 Meeting Called to Order.
W. W. Freeman, Vice-Chairman.

9:00 Charles A. Coffin Prize Committee,
P. S. Arkwright, Chairman,
Georgia Power Co.,
Atlanta, Ga.
Presentation — Charles A. Coffin Award.

9:25 B. A. Rolfe and Orchestra.

9:30 Public Policy Committee.
W. W. Freeman, Vice-Chairman,
Columbia Gas & Electric Corp.,
New York, N. Y.

10:00 B. A. Rolfe and Orchestra.

10:10 Frieda Hempel, Soprano.

10:20 Albert Spalding, Violinist.

10:30 B. A. Rolfe and Orchestra.
(Broadcasting starts—WEAF Red Network.)

10:35 America's Fifty Years of Aladdin.
Julius H. Barnes, President,
Barnes-Ames Co.,
New York, N. Y.

10:55 B. A. Rolfe and Orchestra.

11:00 Frieda Hempel, Soprano.

11:10 B. A. Rolfe and Orchestra.

11:15 Albert Spalding, Violinist.

11:25 B. A. Rolfe and Orchestra.

11:30 Adjournment.

(Note: At the conclusion of this session the audience will please retire to the loggia and corridors, so that chairs may be removed for dancing. Music by B. A. Rolfe and Orchestra. This session will be broadcast through the courtesy of the National Broadcasting Company. A list of participating stations will appear in the convention daily.)

ACCOUNTING SECTION SESSION

J. F. Ford, *Chairman.*
W. R. Emerson, *Vice-Chairman.*
Franklyn Heydacke, *Vice-Chairman.*
J. H. Lobban, *Vice-Chairman*

Tuesday, June 4th, 3:00 P. M.
Meeting Room No. 2—Westminister Hall—
Chelsea Hotel, Boardwalk at Morris Avenue

3:00 J. F. Ford, Chairman,
Accounting National Section,
The Philadelphia Electric Co.,
Philadelphia, Pa.
Announce—Nominating Committee.

3:50 Subject and Speaker to be Announced.

4:20 Subject and Speaker to be Announced.

4:50 Subject and Speaker to be Announced.

4:50 Report—Nominating Committee.

5:00 Adjournment.

COMMERCIAL SECTION SESSION

Marshall E. Sampsell, *Chairman.*
Frank D. Pembleton, *Vice-Chairman.*
T. O. Kennedy, *Vice-Chairman.*
V. M. F. Tallman, *Vice-Chairman*

Wednesday, June 5th, 2:45 P. M.
Meeting Room No. 1—Ballroom—
Atlantic City Auditorium

2:45 Overture.

3:00 Marshall E. Sampsell, Chairman,
Commercial National Section,
Central Illinois Public Service Co., Chicago, Ill.
Announce—Nominating Committee.

3:10 Lighting Bureau.
T. O. Kennedy, Chairman,
The Ohio Public Service Co.,
Cleveland, Ohio.

3:25 Power Bureau.
V. M. F. Tallman, Chairman,
Charles H. Tenney & Co.,
Boston, Mass.

3:40 Merchandising Bureau, Frank D. Pembleton, Chairman,
Public Service Electric & Gas Co., Newark, N. J.

3:55 Speakers and Subjects to be Announced.

4:30 Industry Sales Conference.

4:50 Award of Prizes — K. W. H. Contest.

5:05 Award of Federal Prize.

5:15 Report—Nominating Committee.

5:20 Adjournment.

ENGINEERING SECTION SESSION

E. C. Stone, *Chairman.*
A. D. Bailey, *Vice-Chairman*
Thomas Sproule, *Vice-Chairman.*
Nicholas Stahl, *Vice-Chairman*

Tuesday, June 4th, 2:45 P. M.
Meeting Room No. 1—Ballroom—
Atlantic City Auditorium

2:45 Overture.

3:00 E. C. Stone, Chairman,
Engineering National Section,
Duquesne Light Co., Pittsburgh, Pa.

3:15 Announce—Nominating Committee.

3:20 Shall We Grow Like Topsy or According to Plan?
A. C. Marshall, Vice-President,
The Detroit Edison Co., Detroit, Mich.

3:50 Engineers and Engineers.
F. R. Phillips, Vice-President,
Duquesne Light Co., Pittsburgh, Pa.

4:20 Development of Electrical Standards.
L. L. Elden, The Edison Electric Illuminating Co., Boston.

4:50 Report—Nominating Committee.

5:00 Adjournment.

PUBLIC RELATIONS SECTION SESSION

J. F. Owens, *Chairman.*
E. A. Barrows, *Vice-Chuirman.*
Leavitt L. Edgar, *Vice-Chairman.*
D. C. Green, *Vice-Chairman.*

Thursday, June 6th, 2:45 P. M.
Meeting Room No. 1—Ballroom—
Atlantic City Auditorium

2:45 Overture.

3:00 J. F. Owens, Chairman.
Public Relations National Section, Oklahoma Gas & Electric Co., Oklahoma City, Okla.
Announce—Nominating Committee.

3:15 Awards — Forbes Magazine Public Relations Contest.
B. C. Forbes,
Forbes Magazine and Hearst Publications,
New York, N. Y.

3:25 Speaker and Subject to be Announced.

3:55 Movie - Talkie — "Romance of Power"—C. M. Ripley.

4:25 Subject and Speaker to be Announced.

4:55 Report—Nominating Committee. tee.

5:00 Adjournment.

WHY THEY WENT IN 1890

From an invitation circular to the 12th Convention of the N. E. L. A. held at Cape May, N. J., August 19-21, 1890

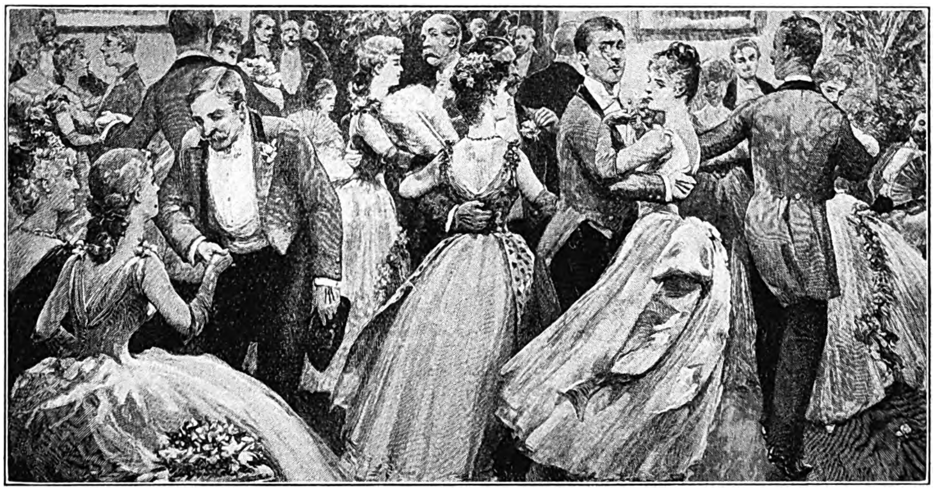
IF YOU have any interest in a central station company, either as a stockholder, manager, superintendent or officer, you should attend the Convention, and there meet those from all parts of the United States who are similarly interested. Through comparing experiences, taking part in the discussions of questions before the Convention, and doing your share to make the meeting profitable to others, it will be sure to be profitable to you.

If you are in a condition to be benefited by an entire change of environment, atmosphere, and occupation, you can secure such a change by going to Cape May.

If you enjoy sea bathing, you will find the finest in the world there. If you have never tried bathing in the sea, you should go to Cape May and gain a new experience.

If you enjoy driving on beach or inland, you can have such drives there.

If you enjoy yachting, you can have fine sailing there. If you enjoy the supplies of a good table well served, you will find them at the Stockton Hotel. If your physical condition is such that you cannot enjoy these things, the salt sea air, the salt water bathing, the fine spring drinking water, the change and rest, will put you into condition to eat heartily and enjoy what you eat.



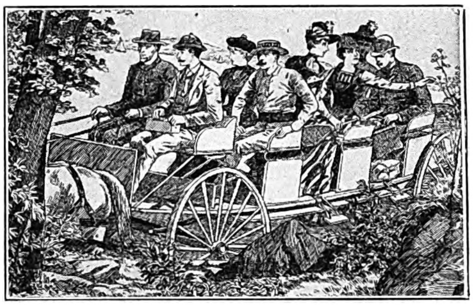
"A hop in the evening"

If you can enjoy a fine orchestral concert during your dinner hour, and a concert or hop in the evening, you will be so entertained at the Stockton Hotel during the electrical season.

If you are interested in the manufacture or sale of any of the long list of supplies used by the central station men, you can meet more of your customers at this Convention in one day than you could in a week of travel. Although there will be no exhibition under the auspices of the Association, you can secure a sample room and display your samples in your own way to the hundreds of users of such supplies who will be at this Convention.

The Way the Time Will Be Spent There

Breakfast from 6 to 10:30.
Morning session of Convention from 10 to 12.
Bathing from 12 to 1.
Dinner from 2 to 4.
Afternoon session of Convention from 4 to 7.
Supper from 7 to 9.
Orchestral concert or hop from 9 to 11.



"If you enjoy driving"

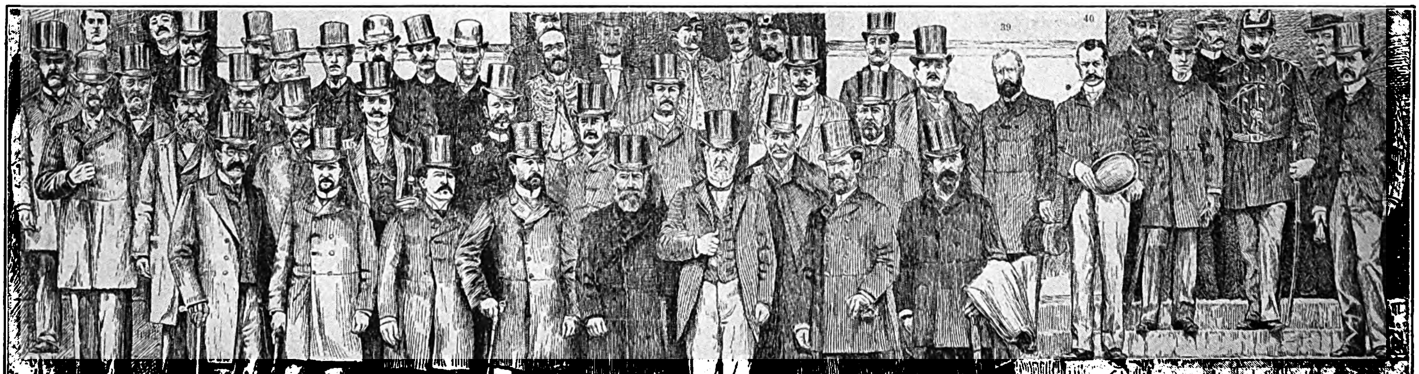
If you are capable of being inspired by meeting the best natured, clearest headed, most progressive men who ever came together in a Convention, you will get enthused by coming in contact with the men who are drawn together by the Convention of the National Electric Light Association at Cape May.

The Convention will meet in the large ballroom of the Stockton Hotel, capable of seating 800.

This room has been placed at the disposal of the Association by the proprietor without charge.

During the dinner hours an orchestral concert will be given in the parlor adjoining the dining room.

For the evening concert or hop, the orchestra and arrangement will be under the management of the Reception Committee. The services of an orchestra of ten pieces, Mr. B. L. Faeder, director, will be furnished by the proprietor of the hotel without expense to the Association.



Amplifier Considers Conventions

By AMPLIFIER

HAVING received, during the past month, what seems like no less than 40 thousand pieces of mail advertising the virtues and magnitude of this or that coming convention and explaining how they will be "bigger and better" than ever before, I have decided to ask myself and, perhaps, some other people: "What's it all about, anyhow?" in the hope that after a few hours of silent meditation, to be followed by a serious consultation with my typewriter, I might find the answer.

"What is a convention and what does it mean to you?" I asked my wife as the most convenient starting point. She sniffed, and when she sniffs, she sniffs. "Just an excuse for a lot of men, old enough to know better, to get away from home and do a lot of things they shouldn't do and wouldn't dare do at home," she replied with quite refreshing frankness. Of course women just don't understand these things. All of which reminds me of an amusing incident which happened to a certain person—name deleted—who attended a big convention about a year ago. At least it was amusing to others if not amusing to him.

THIS particular convention had, like all conventions, its quota of practical jokers. When this "certain person" was packing up to go home one of these practical jokers slipped a lady's handkerchief in the pocket of his bath robe. Since then his wife takes him to work and calls and gets him. If he is late he has to have a written excuse from his boss. The word "convention" has been deleted from the vocabulary of that otherwise happy family.

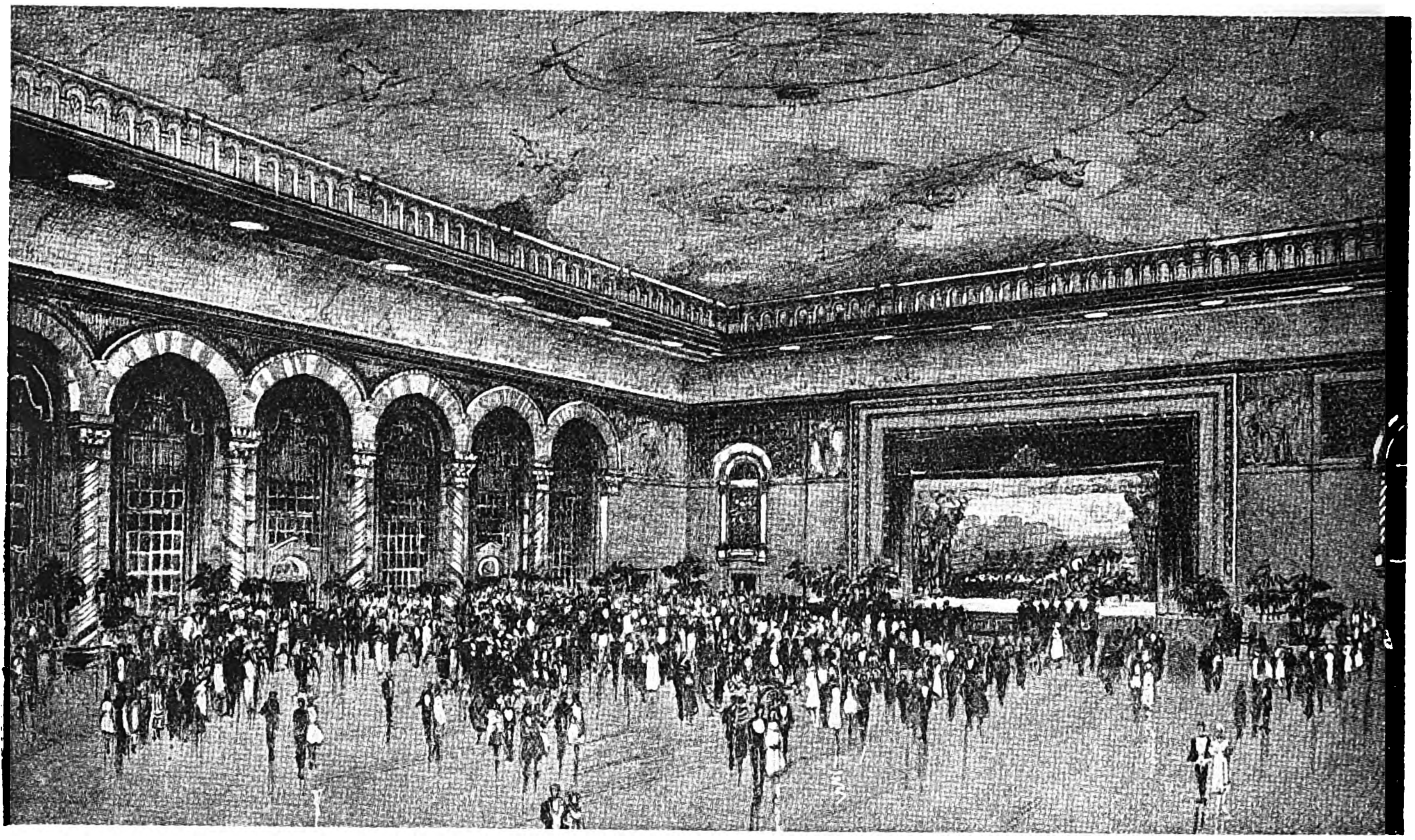
Then there was the young chap who, for some meritorious act or other, won a prize of a trip to a N. E. L. A. convention. It was in Atlantic City and he found lots of things in that well-known town of much greater interest than the sessions of the convention itself. Returning home he gave his wife a running account of all that had happened, and all that he had done, and all the people he had met, and expressed the opinion that his future depended on his attendance at all future conventions. It was good—in fact this young man should have been a writer of fiction.

Unfortunately his wife got hold of a copy of the N. E. L. A. BULLETIN describing the convention and just as unfortunately, she has a good memory. The N. E. L. A. BULLETIN account did not tally with the verbal account given by friend husband. He tried to tell her that the editor of the BULLETIN was all wrong, that he got his information from hearsay, that he was never at the convention, that he wasn't an editor anyhow but just a type setter, and various things like that. No results. If this young man's future depends on his attendance at conventions his career is blasted.

AN exceedingly important executive of a very great company had had a hard day at a convention and his evening was one of considerable relaxation. In the morning, feeling somehow that life was only one great error, he dressed himself carefully and descended to a breakfast he didn't want and thoroughly convinced that he would never want breakfast again. The head waiter followed him into the dining room and touched him respectfully on the elbow. He shook him off and continued ponderously on his way. Again the head waiter approached him with the greatest respect only to be greeted with a snarl: "Well, what do you want?" "Beg your pardon, sir," replied the functionary, "but perhaps you would like to know that you have forgotten your collar and tie, sir."

But to abandon for the time being the lighter side of conventions—Heaven forbid that it should be abandoned for all time—"What are conventions and why?" If we accept a definition for conventions as a meeting of any kind which is held periodically, I think I can qualify to some extent as an expert. I have attended everything from a meeting in Washington, which was little more than a committee of representatives of various interests, to Pan-American conventions in Mexico City and International conventions—they called them conferences because the word convention means something quite different—in Europe. Some of them I have covered as a newspaper man, some of them I have attended as a representative or "delegate," and some of them I have helped to run because I happened to be out of a regular job at the moment. In any event, I feel that I am qualified to contemplate "conventions" with something of the frame of mind of an ancient Greek philosopher.

"WHAT are conventions and why?" Suppose we take for example, one of the most simple conventions in the world—a meeting of the representatives of a number of business enterprises all in the same line of business, called together in the Department of Commerce for the purpose of solving some particular problem peculiar to the industry which is made up of these enterprises. These men represent concerns which, presumably, are competitors. Yet they have a common problem. If it is solved the industry will be benefited, the individual enterprises which make up the industry, will be benefited, and the public, the ultimate consumer of the product of the industry, will be benefited. It is a sample of cooperation between those who are supposed to be fighting one another, which is a great tribute to the genius of President Hoover who, as Secretary of Commerce, called literally hundreds of these meetings having for their purpose the elimination of waste in industry by stimulating industry to solve its own problems



Ballroom of the Atlantic City Auditorium

of waste. It has been estimated that this program has saved American industry more than 500 million dollars a year, which will be reflected, in the long run, in retail prices to the consumer.

Or, let us take what was called the National Conference on Street and Highway Safety, of which Mr. Hoover was chairman. This was nothing more or less than an annual convention of the representatives of all groups—the railroads, the automotive industry, the street railways, the National Safety Council, the automobile owners, the taxicab interests, the Chamber of Commerce of the United States, the insurance people—interested in street and highway accidents. It eventually produced a uniform traffic code which is gradually creeping into all State legislation, and which, it is hoped, will eventually establish uniform traffic laws and regulations throughout the United States, to the great relief of the millions of motorists in this country. Incidentally, through the medium of various committees which have worked throughout the year, it was able to define the problem and produce reports which have been invaluable to traffic authorities ever since.

Suppose we go down to Mexico City and attend a meeting of the Pan-American Federation of Labor presided over by that great old man, Samuel Gompers, now deceased. It was filled with radicals from South and Central American countries. All around the edges were frankly professed communists, I. W. W.'s and bolshevists. It was made up of labor unions of all of North and South America and there was a concerted effort to place the convention on record as being opposed to everything from candy for children to the Government of the United States. Under the skillful guidance of Mr. Gompers and his lieutenants nothing happened. Communism and Bolshevism were washed out and organized labor of the new world was able to stand forth as an opponent to the chaos of sovietism and as an advocate of lawful organization for the good of the many and the confusion of those who would bring about anarchy.

TURNING to Europe let us wander into an assembly of the League of Nations. Regardless of our individual opinions as to whether or not the United States should join hands with the League it is an honest effort to bring about some kind of order after the chaos left by the Great War. Here we find representatives of all of the peoples of the world. If they do nothing else, they have a chance to get acquainted and to interchange ideas. I have had luncheon in the International Club in Geneva and counted representatives of more than 30 countries, all eating—a New England boiled dinner with a fancy French name which the chef had served as a very special delicacy. Even though these people may never reach a definite agreement on anything under the sun, this alone must be helpful in the effort to bring about an understanding among peoples who have never been able to understand one another heretofore. Is it worth while?

Coming back to the United States we are faced with an endless chain of all sorts of conventions. There is the convention of the United States Chamber of Commerce, which presumably represents American business and industry. There are conventions of folks who make clothes, who sell groceries, who manufacture all sorts of things, of welfare organizations, religious orders, pacifists and advocates of adequate national defense, of all sorts of public services, to say nothing of the conventions of luncheon clubs, women's organizations and what not. What are they all about, and do they mean anything to the progress of our social, political, and economic life?

The best way to answer such a question is to examine just one great national convention, and for this purpose, I will take the annual convention of the National Electric Light Association and more particularly, the coming 52nd convention of the National Electric Light Association. What do these conventions produce that justifies the expenditure of the money and time necessary to make them successful?

IT has been said that the real justification of such a convention is that it is the only way to establish a background for the publication of the proceedings. Suppose we play with this idea for a while. If I were going to write a history of the light and power industry—an Herculean task—where could I go to get the necessary material? Nowhere except the proceedings which have been published since the days of the first convention in 1885. It is only there that I can obtain, not only a complete history of the industry, but an adequate picture of the contemporary thought of public utility leaders of the various years. It is the speeches, the committee reports and the final conclusions reached by these conventions that produce the only authentic history of an industry which touches the lives of more people than any other industry in the world; and without these conventions and their records this history would have been lost forever.

Turning back to the record of the convention of 1885, it is interesting to see what the leaders of the industry, then barely three years old, were thinking about. It is also interesting to note among the names of these early pioneers many of those who are the leaders of the industry today. We find the late Mr. Carter Harrison, then Mayor of Chicago, saying, in his address of welcome: "As the father of over 600,000 people, all looking to me for protection, I say we want electricity, but we do not want death dashing like a horrid monster through our streets." Later on in his speech, however, he "hedged" a little and said: "What a startling thing it will be when bottled electricity will put a street car on the rails and send it whirling from the heart of Chicago to the outskirts." What would Mr. Harrison think of his remarks if he could come back and see, for example, the Illinois Central trains gliding along the Lake Michigan shore with apparently no more power than a tiny contact with a third rail?

In this same convention we find the greatest skepticism with regard to the use of electricity as power. A gentleman named Johnson was on the program with a paper on electricity and the electric motor. The presiding officer "begged the indulgence of the conference" saying "it would do no harm to listen to what Mr. Johnson had to say." But Mr. Johnson was militant and had many "wild predictions" to make. He claimed that electric street cars were a certainty, electric railroads a probability and discussed electric power for balloons, submarines and torpedoes. In fact, he was the Jules Verne of this convention.

In the light of present day discussion of the relative merits of water power and steam power, it is interesting to find that this discussion started in 1885. Someone suggested the appointment of a committee to investigate the matter, but it was voted down. It seems that even at this time, 44 years ago, the public already was complaining that the lighting companies were making too much money, in spite of the fact that the companies themselves didn't know whether they were making money or not.

AND so it goes, year after year, if one takes the trouble to browse through these proceedings of each succeeding annual convention. The entire history of the light and power industry unfolds itself—an invaluable chapter in the history of the economic, social and industrial development of the United States which would have been lost forever without the convention.

"Why cannot such a history be written from year to year without the necessity of bringing together people from all over the country for a four or five day meeting with speeches, exhibits, reports and what not?" someone asks. The only answer is that it never has been possible and probably never will be possible. The leaders in any great industry are busy men; they are loath to take the time to do anything not actually pertinent to immediate affairs of the moment unless there seems to be a pressing reason why they should do so. This reason is furnished by a great annual get-together meeting to discuss common problems and the possible future of their industry. It is the only way such industrial history has been written efficiently, and probably will be the only way it can be written in all time to come.

But contributions to history are not the only reasons for conventions. Suppose we look over the plans for the 52nd annual convention of the National Electric Light Association. Let us turn to the question of exhibits. We find that there will be over two hundred of them, ranging all the way from flat irons to giant steam turbines, from incubators to power house equipment, from batteries to hydroelectric equipment and so on down the line, covering every phase of the industry, including generation, distribution, and utilization of every kind, whether in the home, the store, the factory, or at such places as the aviation field or the public streets.

The educational value of such a display of the machinery of a great industry cannot be described in words. Thousands of people will visit these exhibits and return home with a clearer understanding of the intricate problems involved in making and furnishing electricity and have a better understanding of the real meaning of public service. People in the industry itself, many of whom have always been engaged in just one department of it, will learn about the many other departments and appreciate what a truly great enterprise they are connected with.

Again, it might be asked, "Why can't such an exhibit be organized without the necessity of a convention?" Again the answer is that it requires some special occasion to stimulate 200 or more manufacturers to go to the expense of taking part in such an affair. In this instance it is the occasion of the getting together of ten thousand or more of men and women engaged in public service all over the United States. This is the primary reason for the exhibits, and that portion of the public which will be fortunate enough to see them will reap the benefit.

BUT there is a deeper and even more important reason for this great "get-together" than the writing of history or the display of exhibits. This is the opportunity—or excuse, if you will—to renew friendships and acquaintanceships among men all engaged in the same kind of effort, and the opportunity to discuss their mutual interests. There is nothing of the psychology of Mr. Babbitt or the atmosphere of Main Street in this. It is an imperative necessity. The light and power industry is, after all, a great national unit in so far as its obligations to the public is concerned. Just as the day of the small isolated generating plant is passing, so has the time passed when the leaders of the industry can act independently of one another. Each must know something of what the other is doing if the industry is to continue to progress and if its service to the public, which touches the lives of almost every man, woman and child in the country, is to continue to improve. Had it not been for these meetings in the past, with speeches by men of national and international note, committee reports, round table discussions and the many sectional meetings, the industry would not be where it is today. At least it seems so to me and, as I said before, I have attended almost every variety of affairs of this sort and in a good many different languages.

No, conventions have a serious and important purpose and, if there happens to be a lighter side, who is there that will say this lighter side does not also serve. For many who will attend it will be the only relief of a year from the work of serving their own respective communities. A little play will make that work seem a little less like drudgery and perhaps stimulate to even greater effort in the public service.

What of the future of conventions? Will there ever be a great National Association of Associations covering the whole field of business, industry and economics? Why not? Such an organization could serve many useful purposes. For example, there might be a committee to determine what the perfect delegate should wear for breakfast, the sort of bedroom slippers and pajamas that are *ne plus ultra,* and how much ginger ale he should put in his boss's glass, in case said boss uses ginger ale.

Sounds silly doesn't it, but, again, why not? As it is, at the present time the man from Iowa looks at the man from California or Florida and wonders which is correct—the plus fours with the walking stick or the morning suit with a tennis racket. It is all a jumble. Scientific work by committees of such an Association of Associations would solve many problems and above all—tell delegates to conventions just what to do and when to do it and, what is more important, what not to do and when not to do it.

ONE reason why they call this a great country is because a fellow can sleep in a box car tonight, write a popular song tomorrow and be riding in a limousine the next day.—*Two Bells.*

CONVENTION AND EXHIBITION CALENDAR

Friday, May 31st:

Dedication and laying of the corner stone of the new Atlantic City Auditorium in the early afternoon.

Exhibition will be opened at 7:30 P.M. to the general public, remaining open until 11:00 P.M.

Diamond Jubilee of the municipality of Atlantic City and Light's Golden Jubilee will be inaugurated.

Vice President Charles Curtis, Sir Esme Howard, British Ambassador, and Don Alejandro Padilla y Bell, Spanish Ambassador, with other distinguished guests, including Preston S. Arkwright, President of the National Electric Light Association, will participate.

The initial inauguration ceremonies will be conducted from the plaza in front of the Municipal Auditorium and will be concluded from the stage of the Main Hall of the Atlantic City Auditorium.

Saturday, June 1st:

Registration will open at 10:00 A.M.

Exhibition will be opened to the general public at 10:00 A.M. and remain open until 6:00 P.M.

The Grand Inaugural Ball, as part of the dedication ceremonies of the Municipal Auditorium, will be held in the Main Ballroom of the Atlantic City Auditorium at 8:30 P.M. Admittance to the Atlantic City Auditorium on the evening of Saturday will be only by tickets which are to be sold.

Sunday, June 2nd:

Registration will open at 2:30 P.M.

Exhibition will be opened to the general public at 2:30 P.M. and will remain open until about 10:00 P.M.

During the afternoon there will be band concerts in the Main Hall in which the exhibition is housed, and from four to five o'clock members of church choirs and choral societies, numbering several hundred, will give a song festival from the stage.

Monday, June 3rd:

Registration will open at 8:30 A.M.

Exhibition will open at 9:00 A.M. to delegates and guests only.

The President's Reception at 9:00 P.M. to be followed by dancing.

Tuesday, June 4th:

Registration will open at 9:00 A.M.

Exhibition will open at 9:00 A.M. to delegates and guests only.

First General Session at 10:00 A.M.

Accounting National Section Session at 3:00 P.M.—Chelsea Hotel.

Engineering National Section Session at 3 P.M.

Seaview Day Entertainment for the ladies.

Dancing in the evening.

Wednesday, June 5th:

Registration will open at 9:00 A.M.

Exhibition will open at 9:00 A.M. to delegates and guests only.

Second General Session at 10:00 A.M.

Commercial National Section Session at 3:00 P.M.

Card Game for ladies in afternoon.

Entertainment and Dancing in evening.

Thursday, June 6th:

Registration will open at 9:00 A.M.

Exhibition will open at 9:00 A.M. to delegates and guests only.

Third General Session at 10:00 A.M.

Public Relations National Section Session at 3:00 P.M.

Public Policy Committee Session at 9:00 P.M. Dancing at conclusion of this Session.

Friday, June 7th:

Registration will open at 9:00 A.M.

Exhibition will open at 9:00 A.M. to delegates and guests only, remaining open until 1:00 P.M.

Fourth General Session at 10:00 A.M.

Convention adjournment about 1:30 P.M.

This Is Atlantic City

Some Facts That Should Interest You if You Plan to Attend the Convention

By Clifton H. Howell

General Manager, The Atlantic City Electric Company

DURING the past six months my mail has been literally flooded with a great variety of questions about the 52nd convention of the National Electric Light Association, Light's Golden Jubilee, the dedication of Atlantic City's new auditorium, the Festival of Light, and last, but by no means least, the Diamond Jubilee which will mark the 75th birthday of Atlantic City as a municipality.

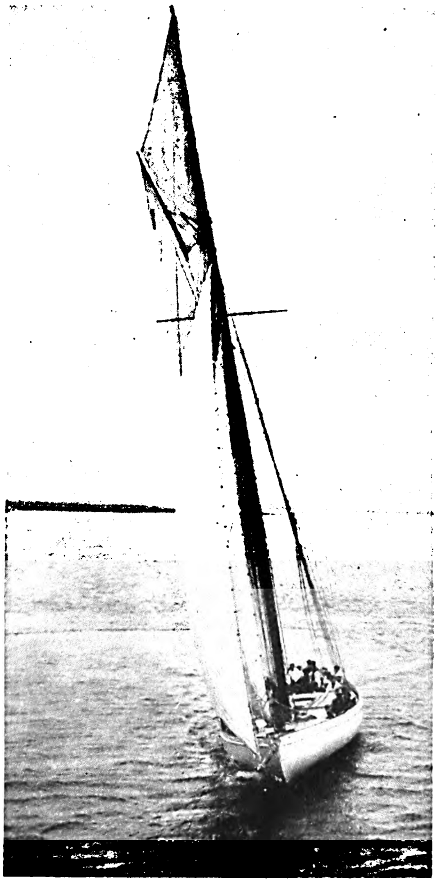
Most of these questions can be answered in a routine manner. If, for example, I am asked anything about the dimensions of the main convention hall in the auditorium I say that if Babe Ruth stood on the stage and drove the longest home run he has ever driven the ball would fall far short of the other end of the room. Or, I explain that Atlantic City has a normal population of about 65,000 people and that every adult in the town could be seated in this room leaving plenty of space for most of the children. As a matter of fact, it will seat comfortably 41,000 people.

If I am asked for information about facilities for dances I say that 3000 people can dance in the ball room adjacent to the main hall and it will be no more crowded than an average Saturday afternoon dancing class. As to parking space for automobiles, it is underneath the building and will accommodate 2000 cars; automotive transportation for 10,000 people.

It's a Big Building

Broadcasting? Certainly—two big broadcasting studios. Hockey? A great rectangle in the main hall can be flooded and frozen in three and one half hours. Music? The pipe organ will be the biggest which any manufacturer has ever attempted and will cost somewhere between $250,000 and $350,000. Chairs for tired folks? We have bought $340,000 worth of them. The chairs which will be used for conventions and meetings are comfortable armchairs, upholstered, and with backs and seats covered with art fabricoid. In fact, this Gargantuan building, costing more than $12,000,000, can respond to any call made upon it by guests of the city, whether it be for facilities for a convention attended by tens of thousands or for a room for a meeting of a few hundred—there are several of these smaller rooms.

In the same way, questions regarding the National Electric Light Association Convention can be easily answered. President Arkwright has said that "this is not just another convention. It has never been held before and probably will never be held again." This is undoubtedly true. It marks the 50th anniversary of the birth of the incandescent lamp and the association is making it an occasion for a celebration such as no industry has ever had. It will inaugurate Light's Golden Jubilee, an international celebration in honor of Mr. Edison, which will last from June 1 until Oct. 21, the date of the birth of this new era of light.



The Festival of Light

The Festival of Light? This is Atlantic City's contribution to the inauguration of Light's Golden Jubilee in honor of Mr. Edison and the great light and power industry for which he laid the cornerstone back in 1879. The city itself has already spent more than $60,000 in this direction. The General Electric Company is constructing and will present to the city a magnificent electric fountain, which will have 21 color and water changes and which is now being permanently installed. Floodlights placed beneath the Boardwalk will play on the crests of the waves as they roll in, lighting them up with every color of the spectrum. The Arch of Jewels, designed by Mr. D'Arcy Ryan of the General Electric Company and containing more than 25,000 electric jewels, is on a scale far greater than anything which has ever been attempted either in this country or in Europe.

The hotels and other business interests generally have joined enthusiastically in with the plans for the celebration and are spending large sums on their own account, for effective exterior lighting decorations. Merchants are planning to decorate their show windows and buildings with the very latest effects in electric lighting. Smoke stacks and steam stacks will be lighted in such a way that flame, instead of smoke and steam, will seem to be issuing from them. The present lighting standards along the Boardwalk will be removed and their places taken by 177 great sprays or clusters, each 26 feet high and each containing 145 golden lamps. In fact, visitors to Atlantic City this year will see a display of lighting such as man would not have dreamed of a few years ago.

The dedication of the new auditorium? That is an easy one to answer. It has been postponed in honor of the Convention of the National Electric Light Association which will christen it. It seemed a fitting thing to dedicate this great building, marking as it does, a new mile-stone in the progress of Atlantic City, at the time of the opening of the first great convention which it will house, particularly in view of the two jubilees which will begin at this time.

Two Outstanding Questions

But running through all of the inquiries which I have received is a strain of curiosity much more interesting than mere questions about dimensions, technical details, accommodations and the like, and which, at the same time, is more difficult to satisfy. It is for this reason that I have accepted the invitation of the editor of the N. E. L. A. Bulletin to write an article and even though my literary experience has been largely confined to operating log sheets and periodic financial statements, I have neither the desire nor the time to extend that experience.

There seem to be two outstanding questions which are asked. The first is: "why is Atlantic City going to all this expense and taking so much time and trouble to do honor to one man—Thomas A. Edison—and to the great industry for which, after all, he is so largely responsible?" The second is: "how can a city of 65,000 people build and maintain a $12,000,000 auditorium which cannot possibly hope to earn more than operating expenses, leaving other carrying charges to the local taxpayers?"

To answer these questions properly it is necessary to study briefly the history of Atlantic City, the role which it plays in our national life, its psychology and more particularly the psychology of its people. Unless one understands this great resort as a national institution one cannot possibly see why it should embark on an undertaking of this kind when the city cannot hope to benefit directly in the way of definite financial return.

A generation ago the casual visitor carried away a more or less kaleidoscopic picture of the boardwalk, "hot-dog" stands, salt water taffy, auction rooms of the sort that only led the unwary buyer to disappointment, merry-go-rounds, band music, piers with devices designed to produce laughter, a beautiful beach peopled with tens of thousands of people in rented bathing suits, a forest of frame hotels and a general atmosphere somewhat similar to that found at Coney Island. One went up to the Inlet to go sailing and down to the other end of the Boardwalk to see the Great Elephant Hotel. In between was a long lane of small shops, eating-places, fortune tellers, beach front hotels and what not.

Something Quite Different

The Atlantic City of today is something quite different. It has taken on a new dignity and its citizens realize that while it is not a producing community in the sense of manufacturing all sorts of goods to be shipped to the four corners of the country, it is producing and offering to the people of the United States something which we think is of far greater value and which cannot be measured in dollars and cents. I say of "far greater value" because almost any community with good transportation facilities, proper housing conditions and within reach of adequate markets, can produce material things. But nowhere in the world can one find, in a single resort, such a great diversity of things intended to bring rest from the drudgery of everyday life and relief from the monotony of the tasks which go to make up what is called "earning a living."

It is because of this fact that in the 14,000,000 people who visit Atlantic City every year one will find the greatest cross section of the American public that it would be possible to find anywhere. These people, themselves, provide a study in humanity which should be the joy of any sociologist. The reason is that in Atlantic City the man of modest income, giving his family the annual two weeks' vacation, can have just as good a time and see exactly the same things as the man whose income tax alone would support several families in comfort and who has a hundred dollar a day suite in a beach front hotel.

To Fit All Purses and All People

Atlantic City is a city of 65,000 population with accommodations for 500,000 people. It is perhaps the only resort in the world which offers the opportunity for a vacation which will cost no more than the sum set aside for that purpose or the opportunity for a vacation which will cost any sum the individual may have to spend. One can secure a room with three good meals a day for a fixed sum per week in a modest hotel one or two blocks from the boardwalk or can secure accommodations in some palatial beach front hostelry and pay, if he so desires, any sum he pleases. Or, he can go to one of these same beach front hotels and know exactly what his bill is going to be at the end of his visit. He can secure rooms in a cottage or he can rent a cottage which may cost him $10,000 for the season. Atlantic City has something to fit every pocket-book, and its guests during the season are drawn from almost every walk of life.

Among them one finds book-keepers and capitalists; law clerks and supreme court judges; cub reporters and authors of best sellers; social leaders and men and women who do not own, and never expect to own, evening clothes; government stenographers and cabinet officers; college graduates, erudite professors and presidents of great universities; folks tired from a year of great effort and folks tired of having nothing to do; people of every possible social or financial status; Atlantic City has something for each and every one. It is because of this that it is unique among resorts and it is because of the realization of this that it and its people have acquired a new dignity. It is rendering a service which can be rendered nowhere else. It has been rightly called: "The Playground of the World."

A Neat Show Window

And so we come to our first question: "Why is Atlantic City, which is full to overflowing all during the season, spending so much money, time and effort to do honor to Mr. Edison and the electric light and power industry?" Let us see.

Essentially, it is, among other things, a great show window. More than 14,000,000 people pass this show window every year and it costs no more to look than it costs to look at the shop window of any department store. It is for this reason that such an institution as the General Motors Corporation has gathered together, for the first time in its history, all of its products under one roof. Nothing is sold and it costs nothing to look at them. Literally hundreds of other great enterprises have done exactly the same thing until the city is literally a university of American business and industry. The exhibition of the light and power industry which will be housed in the auditorium will, of itself, be an education in this great force which at some time or other touches the life of every man, woman and child in the United States.

One of the things which has made this great show window possible is electricity. Without it Atlantic City would be the Atlantic City of two generations ago. It is not only the "window dressing," but it has made possible almost everything which the community has to offer those in search of diversion and forgetfulness, for the time being, of the drab tasks of everyday life. The city and its people know this, and what is more fitting than this spontaneous expression of appreciation on the occasion of the 50th birthday of electric light and the industry built on the genius of one man—Thomas A. Edison?

We would indeed be ungrateful if we did not seize this opportunity to do first honor to him—a citizen of our great State of New Jersey—who has labored here in this State for the last half century. It is altogether fitting that we should dress up our Atlantic City— this international show window—with this great exhibition of lighting and to thereby evaluate the electric light on a new and vastly higher plane.

Satisfying Pride

There is nothing commercial about this celebration which is costing the taxpayers generally, as well as hotel owners, merchants and other individuals, so much. It has nothing to sell. It will add but little to the material prosperity of the community. But it will satisfy that streak of pride which runs through the character of all self-respecting peoples—a desire to put on "our best front" and to acknowledge our debts whether financial, moral or social.

The answer to the second question: "How can a city of 65,000 people build and support a $12,000,000 auditorium and why should it attempt to do so?" can be found, to some extent, in the answer to the first. This colossal enterprise is the dream of one man—former Mayor Edward L. Bader—and to him should go full credit for its final consummation. One of the most distressing things to the citizens of Atlantic City is that he could not live to see it. When he first projected the idea he met with nothing but ridicule and opposition. Single handed he fought for it at first. He realized, better than almost anyone else, Atlantic City's future destiny and knew that it must be prepared. Starting as a $7,000,000 project it grew to an expenditure of $12,000,000 and the end is not in sight. Today we are the proud possessors of the greatest auditorium and convention hall in the world. Only recently an official of the city of Chicago, in response to a letter, said: "We have a pier 2250 feet long. We'll send that down to you and you can stick it off in a corner somewhere."

But why? What is the answer?

In the first place Atlantic City is becoming the most popular convention city in the United States. Business leaders from all over the country visit us during the course of the season, look at our show window, and go away convinced that it is an ideal spot for the annual convention of any industry. It has none of the disadvantages of the large metropolitan city in that it is comparatively small and compact, making it possible to hold the delegates more or less together; a difficult task, as anyone who has managed a convention knows. It has a vast amount of diversion for these same delegates when they are "off duty" thereby eliminating any possibility of a "tiresome" atmosphere. And again, for the sake of emphasis, it is the world's greatest show window.

The Obligation to Our Customers

These people are the customers for our only product—the facilities of a great playground. We owe them the same obligations as those of any manufacturer or business man to his customers. Our ability to house the great conventions which have sought our hospitality in ever increasing numbers has constantly been challenged and each year we see new and bigger facilities being added to our present $100,000,000 investment in these magnificent beach front hotels. A convention which is attended by a thousand or fifteen hundred people normally will be attended by five or six thousand when it is held in Atlantic City. This is not boastfulness; it is fact which can easily be proved by the records.

But what to do? The answer has been found in Mayor Bader's dream. He realized that Atlantic City must either progress and add to its facilities or go back. He said that it would either reach, in the near future, its rapidly approaching peak and then sink quietly back into the oblivion of a second-rate summer resort, or it must respond to the demands of its customers regardless of the cost. And in spite of ill-health and many worries he "sold" the idea and sold it so well that we, of Atlantic City, were fired with all of his enthusiasm and today think of him in terms of the most profound gratitude.

And so we have the answer to our two questions as well as I can give them. It may sound idealistic or altruistic or anything else which the student of community psychology may choose to call it. For myself, as the operator of a light and power company, I can only say I am intensely grateful to my community for the manner in which it proposes to do honor to my industry and its Grand Old Man, Thomas A. Edison, and grateful for the great vision which will make it possible for us to entertain such an organization as the National Electric Light Association in a fitting manner on the occasion of Light's Golden Jubilee.

A Group of Atlantic City Hotels

President Hoover to Head Light's Golden Jubilee Committee

President Hoover will head the General Committee sponsoring Light's Golden Jubilee, the world-wide tribute to Thomas A. Edison and celebration of the fiftieth anniversary of the inventor's perfection of the incandescent lamp.

In accepting the honorary chairmanship, President Hoover wrote: "I shall be delighted to act in any capacity that will mean a genuine tribute to Mr. Edison's services."

Other members of the committee announced to date are: General Robert L. Bullard, John W. Davis, Harvey Firestone, Henry Ford, James W. Gerard, Clarence H. Mackey, Andrew W. Mellon, John D. Rockefeller, Jr., and Charles W. Schwab.

During the N. E. L. A. convention at Atlantic City, one day will be set aside as Edison Day. On this day detailed announcement of Light's Golden Jubilee will be made and the official Plan Book will be distributed.

Throughout the summer and early autumn there will be made events to keep Light's Golden Jubilee at the forefront of public attention, all leading up to the official celebration on Oct. 21, the fiftieth birthday of the lighting of the first practical incandescent lamp. A speaker's bureau has been organized and will provide a corps of speakers who will carry the story of Light's Golden Jubilee to over ten thousand Chambers of Commerce, civic organizations such as advertising clubs, Rotary, Kiwanis, Boy Scout organizations, Girls' Campfire organizations, and others; women's clubs, lodges, trade groups, and other similar types of organizations.

Governments and other institutions throughout the world will also find opportunity to honor the founder of the epoch of light. A trained group of writers, guided by leaders of international reputation, will provide the press, magazines, and trade journals of the country with appropriate accounts of each event as it occurs and will furnish authentic articles on the part that lighting plays in making progress. News reels and talking movies will help to impress the public mind with the magnitude of Light's Golden Jubilee.

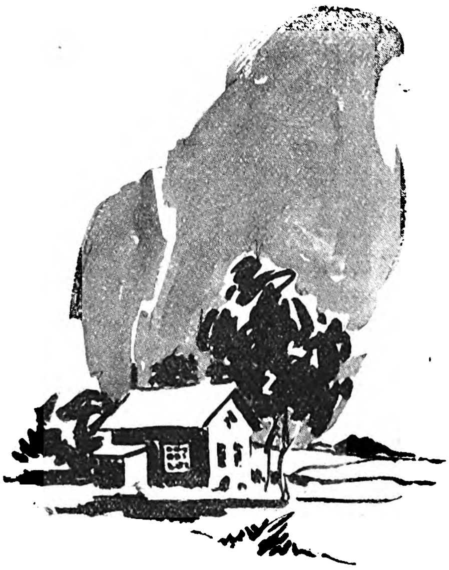
Following the opening of the celebration of Light's Golden Jubilee in Atlantic City, May 31st, coincident with the celebration of Atlantic City's Diamond Jubilee and Festival of Lights and the opening of the N. E. L. A. Convention, the next major event in the celebration Light's Golden Jubilee will be the Fifth Annual International Festival of Lights at Niagara Falls on June 13, 14 and 15. There will be the dedication of the new Municipal Airport, a giant illuminated parade, special fireworks, the annual convention of the Loyal Order of Moose, with its own parade, and a reproduction of the first electric lighting generated by falling water at Niagara Falls fifty years ago.

The Niagara Falls celebration is being arranged under the auspices of the municipal governments on both sides of the river, in cooperation with civic organizations, industries, citizens and the great hydro-electric plants on both sides of the river.

Then, on Oct. 19, two days before the actual celebration, *The Saturday Evening Post* is expected to carry the tribute of the lighting industry to its founder. This tribute will take the form of a special section of more than twenty pages, to be printed in full colors.

Many magazines are expected to carry advertising messages to herald Light's Golden Jubilee. Among these will be the women's magazines because who, better than the women of the world, appreciate this Age of Light?

All over the land replicas of the first lamp built by Edison will be on display. Stores will have their windows decorated in the spirit of the jubilee. Exact reproductions of the New York *Herald* of Dec. 11, 1879, announcing the invention of "Edison's Light," the light which burned "without gas or flame, cheaper than oil," will be distributed to hundreds of thousands of homes through many different channels. What better opportunity to get a bird-eye view of the Age of Light? These plans are but the preliminaries leading up to the official celebration on Oct. 21. A later issue of the Bulletin will give details of what is planned for that date.



Edison's original laboratory at Menlo Park

Edison, founder of the Age of Light, is with us in the flesh. In this actual presence the youth of today catches a profoundly human inspiration — a practical lesson in success from this man who was so little appreciated in his youth, and who later became the founder of this great age. Here we have inspiration, not out of copy books, but out of the daily records of the times.

That is why the fiftieth anniversary of the invention of the practical incandescent lamp should be the greatest golden jubilee the world has ever celebrated!

What civilized man can honestly deny that much of his happiness, comfort, and well-being is due to Edison? What industry can honestly stand aloof and say that it has not been revolutionized by this Age of Light?

What educator will quibble with the assertion that no greater opportunity will ever exist to impress upon the youth of the world, the ultimate triumph of perseverance, fairness, and hard work, than this living tribute to a man who coined the significant phrase, "Genius is one per cent inspiration and ninety-nine per cent perspiration?"

Light's Golden Jubilee will be the greatest tribute that has ever been paid to a man, living or dead, because it bows before a man whose deeds place him definitely among the greatest of the immortals. It takes its bigness, its impressiveness, its constructiveness from the man it honors. The man of miracles. Our "Great National Asset."

Behind the Veil

The Philosopher's Stone

By ERNEST GREENWOOD

The second of a series of articles under the general title of "Behind the Veil" which will portray against a social-historic background, the evolution of the electrical industry and the chief personalities that have been instrumental in its growth

THERE is an old saying, familiar to everyone from the days of earliest childhood, that "necessity is the Mother of invention." But is this true? Is a great invention summoned by necessity, or does it create the era that it serves? It is a question which has been debated since time immemorial, but like most of the broad questions raised by history, no definite, positive answer is possible.

Suppose we take, as an example, the invention of the incandescent lamp. Was it brought into being by Edison because of a crying need for a new and different kind of artificial light, or because of the restless desire, so characteristic of the American people, for something better than that which they have? Did it not create this great era of light which followed and which it has, in turn, served so faithfully?

EIGHTY years ago 700 ships went forth to gather whale oil with which mankind might read or write at night. No better common illuminant was known on Feb. 11, 1847, when Mr. Edison was born. Kerosene succeeded whales and gas succeeded kerosene. Between 1865 and 1875 great progress was made in the art of lighting homes with gas, and as long ago as 1855 Robert Wilhelm von Bunsen had invented the blue flame gas burner which is still in use today. About the time when electric lights threatened to supplant gas, Carl Auer discovered the incandescent gas mantle for which he was awarded the title of "von Welsbach," and the Welsbach mantle is used today wherever gas is burned for street lighting. Some of us of the passing generation still remember, somewhat regretfully, the old kerosene student lamp, with its amber or yellow shades and its comfortable home-like glow.

Again, suppose we take the inventions of Edison, which made the central generating station—the first one of which was placed in operation in 1882—possible. True the generating station was necessary for a proper exploitation of electric lighting, but can it not be said that it was a product of the incandescent lamp, assisting in the creation of the new era it was destined to serve? The same reasoning might be applied to the steam turbine—it was due to a restless searching for improvements in the art of generating electricity by steam rather than to necessity, *per se*. Scientific research sought and soon found a way to build a steam turbine of almost any size and these Gargantuan machines have created a new era in steam generation, which they now serve. They are rapidly removing the serious fear that the nation will have to depend on water power which can never adequately supply the light and power needs of the people.

ROGER BACON

From a photograph of the Statue by H. R. Hope-Pinker, at Oxford University

To thoroughly appreciate the thesis that great inventions create the eras which they serve rather than come into being because of necessity, a brief picture of the eighteen hundred or more years which elapsed between the days of Thales and the advent of Friar Roger Bacon on the stage of scientific history must be presented. Bacon, who was born about 1214, lived in a period still overshadowed with intellectual darkness and when ignorance was at a premium. Yet it was he who first insisted that without experience nothing can be known with certainty. He was, perhaps, the first to advance the science of "experiment" or the method of research sometimes called "trial and error." "Chariots that may be moved without animals at incalculable speed" was one of the prophesies that earned for him a jail sentence. For centuries after his death people were still burned at the stake, or otherwise tortured, for venturing to accept the authority of sound reasoning and of their own experience and observation. And so a glance at the history of the times between the Ionian philosophers who lived 600 years before the birth of Christ and the beginning of the 17th century, (during which time there was little scientific development as we understand science), is required if we are to understand the social and political backgrounds for what has been called, for want of a better name, the machine age.

FROM 490 to 470 B.C. there raged the great war between the Persian Empire, conqueror of all the older empires to the East, and Greece. The Persian armies entered Athens and burned it. But eventually in the narrow bay between Salamis and Athens, Themistocles concentrated the entire Greek fleet and within a few hours the fate of Greece, and perhaps the fate of the whole Western world, was decided. As Geoffrey Parsons in his "Stream of

History" tells us so vividly, "at the first onset, the Persian line was thrown into disorder. Following up their advantage, the Greeks struck right and left, riding over banks of oars, capsizing the enemy triremes, crashing through their sides so that they swiftly sank. The victory became a rout, and by nightfall the broken remnants of the great king's fleet were flying eastward in hopeless disarray. Surrounded by his magnificent court, Xerxes watched the battle at his feet with horror turning to dread. Long before the end, he rose from his throne, rent his robes with a loud cry, and fled the scene. The West was saved."

Within fifty years what many consider the most beautiful buildings ever built arose from the blackened ruins of Old Athens. Within 150 years three great philosophers (whose work remained for 2000 years the basis of every speculation about the universe), lived and died. Science grew slowly, reaching its climax in the mathematicians of Alexandria within a period of about 250 years after the battle of Salamis. This work of accurate study could only make a brilliant beginning; it was in art, poetry and philosophy that the Golden Age of Greece, from 480 to 330 B.C., was supreme.

SOME historians have described this period as "the most brilliant and crowded period of achievement the world has seen." Most certainly our grandfathers thought so. We on the other hand, are inclined to feel, with some justification, that the past 100 years, bringing, as they have, modern transportation, communications, light and power, and all of the thousand and one great inventions which have made such marked changes in the life of civilized man, as the "most brilliant and crowded period of achievement the world has seen." But we must not forget the circumstances surrounding the work and thought of those early Greeks. They had neither background nor traditions of philosophy or science. In modern vernacular they started from "scratch." Considering these things their achievements, which have come down to us through the centuries as the basis of modern thought and achievements, might easily be considered as even more brilliant than those of our own times.

The political structure of ancient Athens was nominally a pure Democracy—crude and clumsy. Every citizen took his turn as a legislator, judge and executive. But only one man in five was a citizen, the other four being slaves or aliens without the right to vote or become citizens. It was, however, a democracy "as direct as a New England Town Meeting" and worked only because the entire voting population could be gathered together for debate. At these gatherings or assemblies, which met four times a month, a council or Senate of 500 was chosen by lot to act as a standing committee In this council the members took turns, fifty at a time, doing the executive business of the city, and from the fifty, one person was chosen by lot, to be at the head of the government for 24 hours. This may seem to us to be a bit strange and worth thinking about when we realize that it was a pure democracy and not a republic such as the government of the United States. We might even wonder if the late President Wilson was thinking of these items when he talked about "the self-determination of small peoples" and "making the world safe for democracy." It is quite possible, however, that this method of choosing legislators and executives by lot brought into public service about the same average of wise and expert representatives as our own method of election. One of the compensating features was that the time of service was brief.

Curiously enough we have, even today, a class of people whom the history of experiments in government, and more particularly in democratic forms of government, seem to teach nothing. Our own republican form of government, which is about as democratic as it could possibly be and still be practical, is so unwieldy that it has great difficulty in conducting the affairs of government on anything like a business basis. Yet these folks would have it take over all sorts of businesses of production and distribution which have, up to the present time, been left to private enterprise.

BUT there was a kind of executive which the Athenians did not choose by lot. That was the strategus, or general. There were ten of these generals and the ten elected a leader. Pericles was chosen chief strategus in 460 B.C., and was reelected year after year. It was during his administration that Athens reached her greatest heights and it is interesting to note that while nominally a democracy, Athens, during her greatest years, turned over the reins of government to one able man.

We can find more than one interesting analogy to this situation in the history of our own times since the great war. Italy, for example, has turned over its government, lock, stock, and barrel, to one man, Mussolini, who, to paraphrase a sentence by Richard Washburn Child, has cleared away "Chaos' own junk pile" in that country. "Mine" says the most unique figure on the European stage—"I take the responsibility for all." Hungary welcomed Admiral Horthy while Spain submits more or less smilingly to the dictation of de Riviera. Perchance there are other countries that might do well to consider the advantages of "one able man" as dictator—at least for the time being.

THE three Peloponnesian wars (459-404 B.C.) ended the power of Athens for all time. It was still the Golden Age insofar as the Greek mind was concerned, but in all matters of government it was an era of blundering. A democracy, in which every decision must be made directly by thousands of citizens assembled in meeting, presents a hopeless problem. During this period the Athenian democracy in its desperation became cruel and vindictive and made hundreds of mistakes. It was this beaten and humiliated Athens which put Socrates to death in 399 B.C., one of the many disgraces that marked the government of Athens by the generations that succeeded Pericles.

Eventually King Philip of Macedonia conquered most of the Greek states and planned to unite all Hellas in one empire. He was succeeded by his son Alexander (356-323 B.C.) who subdued Greece, routed the Persian armies in Asia Minor, freed the Eastern Greeks, conquered Phoenicia and Egypt and eventually brought under his rule all the peoples of the Orient between the Euphrates and the Tigris on the West and the Himalayan Mountains and the Indus River on the East. He has gone down in history as Alexander the Great. But Parsons tells us: "In organizing Hellas into a vast empire, Alexander unwittingly killed her soul. But he was keenly appreciative of the great heritage of Greece, and, even while himself sinking deeper and deeper into oriental luxury, labored to spread the civilization in whose name he conquered. He took Greek scientists with him into Asia, and through them sent back to Athens hundreds of specimens of plants and animals for his old tutor, Aristotle. He founded Greek cities bearing his name even on the frontiers of India. From these centers Greek art spread across Asia, to inspire the art of India, and to influence the artists of China and Japan. Attic Greek became the language of cultivated men throughout the empire. Greatest of all, the emperor founded in Egypt at the mouth of the Nile the city of Alexandria, to become the repository of all learning and to remain for 300 years the intellectual center of the ancient world."

All this happened more than 1500 years before the invention of printing. Consequently the great Alexandrian Library contained no books. It consisted, instead, of more than 500,000 manuscripts written on long rolls of papyrus arranged in about 120 divisions and sub-divisions. One has only to go into a modern public library to realize the difficulties which the student of those days must have encountered in using these manuscripts. The texts of the classics, however, were carefully edited and most of the modern editions of them are founded on the Alexandrian editions. Unfortunately, this library was destroyed by fire during the rioting at the time when Julius Caesar was paying his famous visit to Cleopatra—one of the greatest losses which has ever befallen mankind.

THE leading interest in Alexandria at this time was science. Aristarchus demonstrated to his own satisfaction that the earth and planets moved around the sun, but this thesis was not accepted until the time of Copernicus, some 1500 years later. These Alexandrians had automatic door-openers and sprinklers, endless chains for ammunition-hoists, and even an automatic theater. Running water was piped into houses, with many of the conveniences of modern plumbing; the old folks mourned the "good old times," just as the old folks of today.

Yet nothing came of this most exciting and hopeful era. Under the rule of practical Rome, the intellectual growth of the Western world was stunted and made but little progress until the rise of modern science. Except to a very few, what the wise men of Alexandria knew in the first century before Christ remained completely hidden, for nearly 2000 years. As Mr. Parsons says: "It is the most extraordinary halt in human progress that is known. One cannot pretend to explain it, but one can at least trace the circumstances that surround it."

Rome endured, roughly speaking, for a thousand years—from 500 B.C. to 500 A.D. During the first 500 years it was know as the "Roman republic" but it was a republic in the modern sense only to the extent that the executive heads of the government were elected. The first of these elected heads were two consuls selected by the patricians. In other words the "republic" was in no sense a democracy; it was based on an aristocracy of nobles. The people revolted and finally secured the election of so-called "tribunes of the people." Finally they secured a share in the law-making by means of a huge assembly somewhat similar to the Athenian assembly which became more and more unwieldy as the Roman state grew. Gradually a small compact body known as the "Senate," composed of elderly patricians, forged to the front; eventually even this body was forced to admit to membership "plebians" who had held public office.

The downfall of the Roman republic began when a policy of over-seas conquest was adopted. This period of conquest marched forward from 264 B.C. to 146 B.C., and in that time the entire Mediterranean world and most of the Alexandrian Empire had surrendered to the armies of the Roman Senate. This was followed by 100 years of revolution and counter-revolution with one dictator succeeding another until a strong imperial rule under Augustus, starting in 30 B.C., saved the Roman state from disintegration. During these years of conquest Rome destroyed Carthage, driving a brilliant Semetic civilization out of Europe, humbled the great Hannibal, and sacked and burned the famous Greek city of Corinth. One of the finest libraries in the world was thus destroyed, an act of vandalism far surpassing the deeds of the barbarian vandals who, 600 years later, captured Rome and gave their name to wreckers of civilization.

BUT the Roman republic was doomed. Julius Caesar (102-44 B.C.) returned from the conquest of Gaul which had occupied him for eight years (58-50 B.C.), to find that his old ally, Pompey, had gone over to the Senate and secured election as sole consul, a virtual dictatorship. Caesar crossed the Rubicon, a little stream that marked the boundary of his province, drove Pompey out of Italy, and made himself master of Rome. Pompey eventually fled to Alexandria, where he was assassinated, and Caesar, following him there, fell in with Cleopatra and held up his wars of conquest for eight months while he paid court to her.

Returning to Rome he had himself made Dictator for life. Just five years after he had crossed the Rubicon he was assassinated by his close friend Brutus, at that time leader of a group of fanatical republicans. But the ancient republic, of which these conspirators dreamed, never returned to Rome.

"SCIENCE lay hopelessly dead in Rome," Parsons tells us, "crushed out by the practical genius of her people. The geometry of Euclid was taught, but only to learn the propositions by rote—the reasoning on which they were based was ignored as having neither value nor interest. Mathematics became a useful aid in construction; it ceased to be a science at the very moment Alexandrian scholars were on the brink of brilliant discoveries. The same held true of medicine, astronomy, biology and the other sciences in which Greek genius had so brilliantly lighted the way. The curtain fell upon science in the Western World, not to rise again until modern times." The contemplations of Thales and his contemporary Ionian philosophers on the phenomena of electricity were forgotten.

The decline of Rome was constant after the last of the great emperors, Marcus Aurelius (121-180 A.D.). The end came in 476 A.D. when a Teutonic ruler displaced the last Roman emperor. However, the organization of the Christian Church had, by this time, spread far and wide and greatly affected the course of the barbarian invasions and all that followed. Whether one is a Christian or not there developed from the death of Christ a faith and an institution which have profoundly affected the character and history of all Western civilization.

Following the end of the Roman Empire came the period which is known as the Dark Ages. This period is supposed to have lasted until the death of Charlemagne in 814 A.D., but world history cannot be fenced off by such specific dates and the ninth and tenth centuries were little better than the eighth. It was followed by the so-called Middle Ages which passed their peak and were declining by 1300, to be followed, after a period of transition, by what is popularly known as the "Renaissance."

It was only after the fall of the Roman Empire that alchemy became a part of valid history. The alchemists are sometimes called the "chemists" of the Middle Ages. When this "art" or "science" first began its long career is not known with any certainty. Mercer tells us that "the art properly called 'Alchemy' arose in the second or third century of the Christian era," and that "it resulted from a unison of the practical art of the Egyptians with the philosophy of the Greeks, and with the mysticism which found its home in Alexandria."

WHAT is alchemy and what relation, if any, does it bear to modern science and achievements? To answer, even partially, such a question, a brief survey of the work, knowledge, beliefs and philosophy of the alchemists over a period of many centuries is necessary. To dismiss it and its devotees or adepts as the product of superstition, error, folly and fraud is to be absurd. Its followers were some of the most picturesque and famous personages in the history of European civilization. And just as astrology has resulted in astronomy, and natural magic in physics, so has the modern science of chemistry issued from alchemy. One must disregard the follies, push aside the charlatans, and fix his attention on those inquirers who, in dark and difficult times, experimented and observed, and who handed on and added to our stock of human knowledge. These were the true alchemists and by their work must alchemy be judged.

Modern thought is inclined to view alchemy as a search for that mythical and non-existent substance. "The Philosopher's Stone," by means of which the base metals could be transmuted into gold, accompanied by a search for the "Elixir of Life." Viewed from the standards of our own times and scientific knowledge, it is difficult to conceive of the alchemist proceeding along lines quite as scientific—according to his knowledge—as our own methods. But if one will regard his knowledge and conception of matter as well as his crude equipment and other facilities, he will find that the true alchemist approached his subject quite as scientifically as, for example, the head of any great research laboratory in the United States approaches his work in the light of his present-day knowledge and equipment.

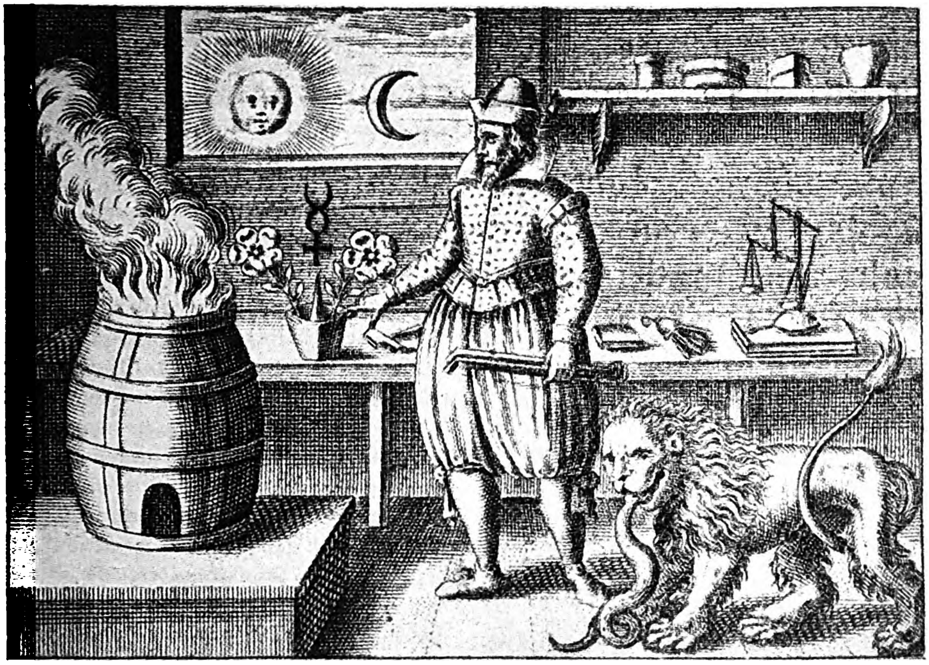
Consider for the moment the regard in which research in pure science is held today. Within the last few years there has been established a great National Research Endowment to be administered by the National Academy of Sciences with a fund amounting to many millions of dollars. The general purpose of this Endowment, according to a statement issued by the Board of Trustees, "is to increase and strengthen American contributions to the mathematical, physical and biological sciences by the creation of a national fund to aid skilled investigators." The light and power industry together with the electrical manufacturers have pledged $3,000,000 to this fund, and this is only one of many great contributions. What would the old alchemists have accomplished with such encouragement?

FIRST, the alchemist observed all about him a universe in what Heracleitus an early Greek thinker, called an eternal "flux." Take a few examples given us by Mercer: Water evaporates: vapor condenses into water. The fuel on the fire disappears in gases and smoke, leaving but a dead ash; the dead ash, in turn, may go to the building up of living plants and animals. Foods are taken, and form flesh and blood; the body decays and returns to the dust from which it sprang. Mercury can be heated so that it becomes a bright red powder—a substance with almost the opposite qualities. Or, take a case which puzzled that clever scientist and sound investigator, Van Helmont, when he tried to account for the growth of a plant. Mercer tells us that "he put a willow weighing 5 pounds into 200 pounds of earth previously dried in an oven, and watered it regularly. At the end of five years he found the plant weighed 169 pounds, whereas the earth, after redrying, had lost only 2 ounces in weight. What was he to conclude? He had not the means of knowing the real nature of water, nor of the carbon dioxide absorbed from the atmosphere. His answer, therefore, seemed to be irrefutable that the 164 pounds of woody matter, leaves, roots, and so forth, were produced by the water. That is to say, the water to all appearance had been changed into a variety of solid substances. A clever scientist was thus forced to a conclusion which was quite in harmony with alchemical doctrine, yet grievously out of harmony with the facts. A modest amount, then, of historical imagination would enable the proud or cynical modern to realize that to be an alchemist was not necessarily to be a fool."

The modern scientist holds that there are more than 80 different kinds of elements which are, relatively to our power of dealing with them, fixed and unchangeable. But the alchemist had quite a different idea. He assumed that all the different kinds of substances are "fluid," so to speak, and pass naturally from one form to another. He conceived each kind as actively striving to develop or grow to a nobler state. His task was to hasten, by special means, what is essentially a natural process. And so, being busy with metallurgy and chemistry, and having noted that fire would make such a startling change in mercury, it seemed to him that it should be a simple matter to change tin into silver or brass into gold. Turning to Roger Bacon, who is sometimes regarded as the herald of modern science, we find him discussing the possibility of transmutation in the Second Book of Aphorisms, as follows:

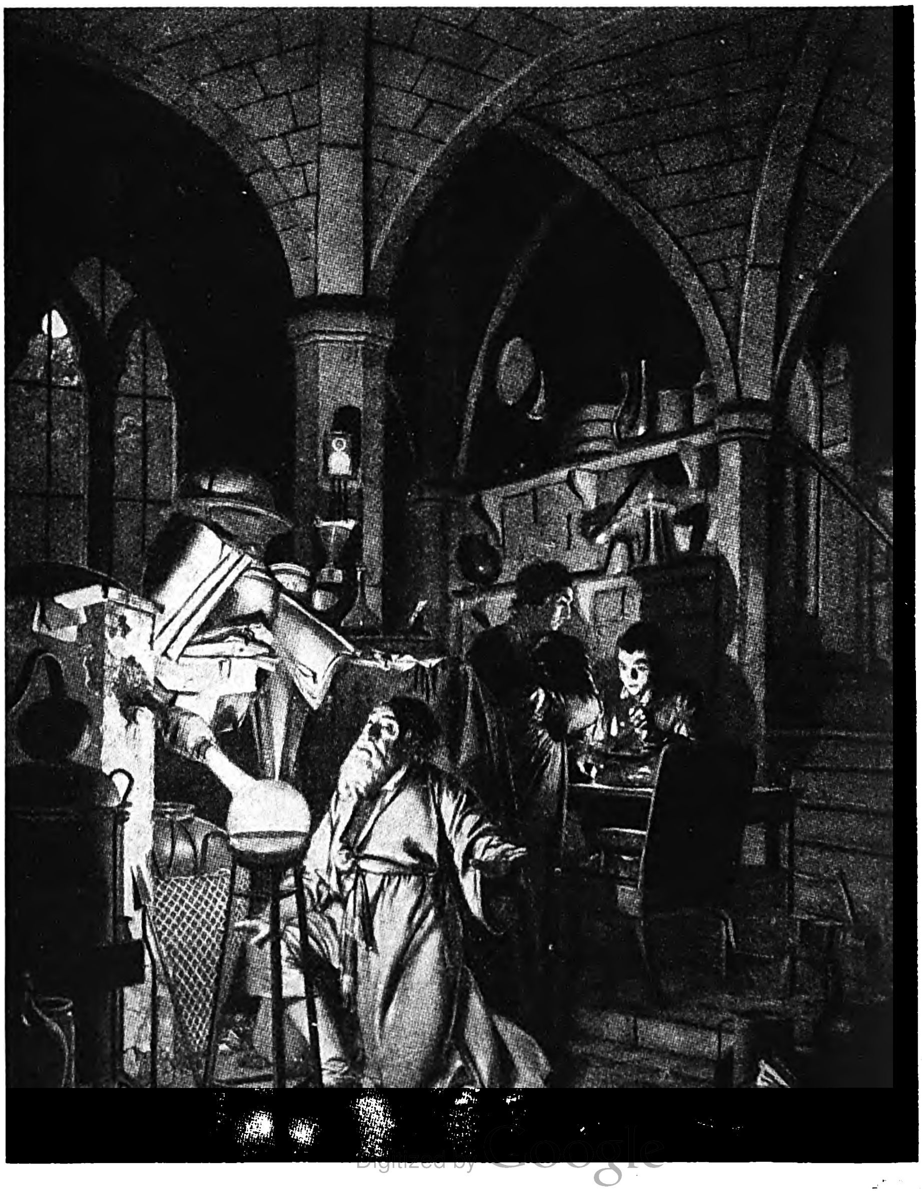
"In gold, for example, the following properties meet. It is yellow in colour, heavy up to a certain weight; malleable or ductile to a certain degree of extension; it is not volatile, and loses none of its substance by the action of fire; it turns into a liquid with a certain degree of fluidity; it is separated and dissolved by a particular means; and so on for the other natures which meet in gold. . . . He who knows the forms of yellow, weight, ductility, fluidity, fixity, solution and so on, and the methods for superinducing them and their gradations, and modes, will make it his care to have them joined together in some body whence may follow transformation of that body into gold."

THE alchemists were always deeply impressed by the processes of growth of plants and animals, and many of them adopted the idea that inorganic substances, and more particularly metals, were endowed with a kind of life; they adhered to the fundamental principles of "Animism." They imagined metals progressing in the earth



THE ALCHEMIST

Two artists' conceptions from "Alchemy—Its Science and Romance," by the Right Reverend J. E. Mercer, D.D., sometime Bishop of Tasmania. Courtesy, the MacMillan Co.



toward perfection, not by changes of a purely physical process, but by a living process. To them they grew like plants. They could see no reason why they could not speed up the slow processes of nature by artificial means just as modern chemistry aims at speeding up divers natural processes. Gold was the perfect metal while iron, tin or lead were imperfect metals striving toward perfection.

With these ideas in mind, what could be more natural than that the alchemist should turn to the problem of turning baser metals into gold? All he needed was a transmuting agent. So their search was for what has become known as the "Philosopher's Stone," a substance presumed to possess perfect qualities which, when combined with other bodies, would act on them; in the case of the base, or imperfect metals, it would purify them and change them into the perfect metal, gold. This stone was variously described: It was a "red powder," a "solid body the color of a ruby," the "color of saffron in powder but heavy and brilliant," the "color of sulphur," "united in all colors." Zosimus, the earliest extant author on alchemy, keeps to the old style. He says:

"In speaking of the Philosopher's Stone, receive this stone which is not a stone, a precious thing which has no value, a thing of many shapes which has no shapes, this unknown which is known to all . . . its kind is one, its species multiple. All comes from the one and all returns to it." An evasive, antithetical paradox, to the modern scientist.

It was also taught that the "stone" had additional virtues such as the ability to make precious stones, diamonds, pearls and rubies, that it could revive dead trees, that it had all sorts of life-giving properties. Health was quite as much an object of anxious longing as wealth in the Middle Ages, and there was an almost universal belief that the "stone" could be used as a panacea for all sorts of bodily ills. It was "akin to the soul of the world" and could influence man's mind as well as his body. Salmon writes: "Those who are happy enough to have possession of this rare treasure, however wicked and vicious they may have been, are changed in their manners and become good people; so that no longer deeming anything on earth worthy of their affection, and having nothing to desire in this world, they sigh for nothing but God and eternal happiness." Norton writes: "The Philosopher's Stone brings to each, succour in his needs; it rids man of vain glory, of hope and of fear; it takes away ambition, violence and excess of desires; it sweetens the hardest adversities. God will place among his saints the adepts of our art." It may be seen that there was a strong religious flavor to the creed of the alchemists.

The laboratory of the mediæval alchemist was not only a place to work, it was often a place of religious exercises. It was frequently equipped with an altar before which the sage would offer prayer for the success of his experiments. There was an atmosphere of mystery and devotional fervor. In the *Mappae Clavicula* there occurs a direction like this: "The Making of Gold.—Prayer you are to recite during the operation, or the fusion that follows, in order that the gold may be formed." And so we see that alchemy was not a science in the modern sense but a mixture of science, philosophy, theosophy, and mysticism. The apparatus of the laboratory was devised for practical uses, and it is interesting to note that many of the vessels still retain their places, and even their specific forms, in our modern laboratories.

ROGER BACON (1214-1292) was one of the first to break away from tradition and explore new territory. For a long time he was supposed to be an alchemist of the orthodox kind and was even branded as a sorcerer. The fact is, he joined hands with the Arabian, Rhazes, who said: "The secret of chemistry is possible rather than impossible. Its mysteries are only revealed by dint of hard work and tenacity. But what a triumph when man is able to raise a corner of the veil which covers nature." Bacon corrected the Julian calendar; analyzed the properties of lenses and convex glasses, invented spectacles for the short-sighted; propounded the theory of telescopes; prepared the way for the discovery of gunpowder and the air pump; and drew attention to the part played by air in the process of combustion.

While we may ridicule and hold in contempt the alchemist and his work, we must realize the difficulties under which these alchemists worked.

Down to the days of the discoveries by the great chemist Lavoisier, there were no known fixed elements to serve as starting points. It was thought that all matter was endlessly transformable, backwards and forwards. Problems that are quite straightforward for us were hopelessly baffling and complex to the alchemists. Furthermore there was a practical side to the effect produced by constant failures. As Mercer tells us: "Kings and rulers who patronized alchemists looked for tangible results. How fared it, then, with adepts who disappointed them? Some saved themselves by plausible explanations—some by flight. Not a few suffered severe punishments or perished by untoward fates. Honest professors who failed came off no better than deceivers and rogues—it was the fact of failure that really mattered. It was thus that a female adept, Marie Ziglerin, was burnt by Duke Julius of Brunswick in 1575. David Benther killed himself to avoid the anger of the Elector Augustus of Saxony. Bragadino was hanged at Munich in 1590 by the Elector of Bavaria. William de Grohnemann was hanged by the Margrave of Bayreuth, who, with grim irony, had this inscription posted on his gibbet, 'I once knew how to fix Mercury, and now I am myself fixed.' Some were invited to courts and then imprisoned until they fulfilled their promises. The device became so common that wise alchemists learned to avoid even the most flattering invitations. Thus strangely were intermingled tragedy and comedy—naïve fanaticism and gross fraud. Mediæval alchemy was in harmony with the spirit of its time."

The history of alchemy is a fascinating one and has been the subject of many volumes. In returning to our original question, "what relation, if any, does it bear to modern science and achievements," we might very well leave it with Aesop's fable of the husbandman who, when he died, told his sons that he had left a great quantity of gold buried underground in his vineyard; "and they digged all over the ground, and gold they found none, but by reason of their stirring and digging the mould about the roots of their vines, they had a great vintage the year following," to which Bacon adds: "so assuredly the search and stir to make gold hath brought to light a great number of good and fruitful inventions and experiments as well for the disclosing of nature as for the use of man's life."

Strangely enough, between the times of the early Greek philosophers and the year 1600 we find little mention of the phenomena of electrical attraction. The power of a magnet, which is still mysterious to us, was, of course, much more mysterious to the alchemist. Its power to attract iron in spite of intervening substances seemed to them to be a "spiritual" force, intangible and invisible and pertaining to the inmost natures of the attracting and attracted body. They placed it in the same category of subtle essences, the action of poisons on organisms, supposing that the permeating power was due to some force which should be regarded as "spiritual" in its nature.

YET if we return to the Zosimus description of the Philosopher's Stone, "this stone which is not a stone, a precious thing which has no value, a thing of many shapes which has no shapes, this unknown which is known to all . . . its kind is one, its species multiple, all comes from the one and all returns to it," can we not indulge our imaginations a bit and view electricity as the true "Philosopher's Stone?" Had the alchemists searched for a force instead of a substance, and, finding it, advanced the art of generating it, harnessing it, distributing it, a few centuries, what would have been the effect on civilization and on the history of mankind?

If we consider gold as the symbol not so much of material wealth as of progress, comfort, convenience and happiness, what great transmutations has electricity wrought in the past fifty years? Truly, it seems that it might be considered not only as the "Philosopher's Stone," but also as the mythical "Elixir of Life" brought under control by the modern scientist so successfully that all may share it.

Strange at is may seem, and in spite of the inventions and prophesies of Roger Bacon and Leonardo da Vinci (1452-1519) who said: "The human bird shall take his first flight, filling the world with amazement, all writing with his fame, and bringing eternal glory to the rest whence he sprang," it was not until the close of the Elizabethan age that electricity began to receive serious scientific attention.

NOTE: The author wishes to acknowledge his obligation to Geoffrey Parsons for his splendid work "The Stream of History" and to the Right Reverend J. C. Mercer, D.D., sometime Bishop of Tasmania, for his "Alchemy—Its Science and Romances."

Cooperative Competition

A Suggestion for Improving Trade Relations

By C. ERNEST GREENWOOD

What is cooperative competition? As the term is used here, it is a merchandising practice in which the leadership in pioneering and promoting appliance service through the direct sale of appliances is taken by the electric light and power companies, while at the same time they unite the efforts of the general merchandising trades in their communities for periodic or continuous selling. Cooperative competition is predicated on the broad policy that the power company is primarily interested in the total appliance business done in the entire community through which revenue from kilowatt-hour sales can be obtained, and not only in the sale of appliances by the merchandising department.

FOR many years the electric light and power companies were practically the only distributors, other than the manufacturers, of electric household appliances. The power companies for the sake of the load building attendant upon the use of the appliances had pioneered their introduction, as they have continued to do in all new applications of electrical energy to household service.

About twenty years ago the electric contractors, urged by the manufacturers and with the full approval of the power companies, began handling domestic appliances. Within the past decade the wide field offered and the great variety of appliances now manufactured has attracted the attention of the general merchandising trades, so that now appliances are sold in the department, hardware, furniture, drug and other stores. Furthermore, high schedule production has intensified "manufacturer to consumer" selling.

It has been estimated that "other dealers" are doing 64 per cent of the appliance selling in small communities, and 72 per cent in the larger cities. Accepting these estimates as facts or as a trend, it is apparent that a striking growth in distribution by the general trades has developed, notwithstanding the charge of unfair competition which has been made against the power companies.

Mr. Greenwood is Commercial Director of the National Electric Light Association. Prior to his work with the Association, he was for many years in charge of merchandising activities of the Edison Electric Illuminating Company of Boston.

The similarity of names might be confusing if it were not reported that Mr. C. Ernest Greenwood, and Mr. Ernest Greenwood, author of "Aladdin U. S. A." and "Prometheus U. S. A.," whose serial "Behind the Veil" is now running in the Bulletin are two entirely separate and distinct gentlemen.

This charge naturally is regretted by the power companies and efforts have been made and are now being made to come to a better understanding of the mutual rights of other dealers and the power companies. As early as 1912, with the desire to be helpful to the dealer, and yet not retard in any way the progress of the appliance load development, the power companies approved the appointment of a joint committee of jobber, dealer, contractors and power representatives at the N. E. L. A. Convention at Seattle to recommend cooperative methods of selling. This was probably the earliest recognition of the electrical contractor as a factor in appliance distribution.

Without doubt we would have been further along the road to a harmonious solution of the appliance merchandising problem and to a fuller mutual understanding if the war had not intervened. During this period the public utility had to solve problems of production rather than distribution, and the merchandising phases of the business were emphasized much less than other objectives. With the problem of production of power solved to a high degree, there again came the pressure for fuller utilization of investment in power houses and facilities. Again the power company felt the urge to promote with utmost vigor the building of the appliance load. Such action was essential in the interest of the security holders, and in the larger sense, the public interest.

WITH the war came a rise in the cost of labor, material and other factors in the production of electrical appliances. The natural result was an increase in retail prices which influenced the method of retail selling. Also during and after the war, appliances such as electric refrigerators, ironers, ranges and washing machines were developed or improved. The cost of these large appliances was such as to make it difficult for people in ordinary circumstances to pay cash for them. Another important factor in the situation was that, due to the abnormal conditions of the war and post-war period, the public appreciation of the value of electrical appliance service had not kept pace with the rising manufacturing and improvement costs.

It follows that the power companies were forced to meet the conditions they found themselves confronted with. The automobile industry, the furniture and musical instrument dealers and, in fact, dealers of most all types of commodities had gone over to the installment plan method of selling. The solution of the power company's problem obviously lay in the adoption of merchandising methods to fit the conditions imposed by the times. This, in short, was selling of appliances on terms and conditions which would attract the public. Without this, many consumers could never have enjoyed the benefits of appliance service. The result of the modern merchandising methods was that a much greater business was drawn to the sales rooms of the power companies.

The increased commercial vigor of power companies intensified relations with other merchandisers. It is not surprising that other dealers handling electric lines were disturbed by the trend of sales.

THE desire of the power companies as a whole is for amicable relations with other dealers which will be to the mutual interest of the dealers, the utilities and of the public. The power companies contend that it is in the interest of the general merchandising trades, as well as their own, that they merchandise appliances to the public. Representatives of associations of the independent trades agree, but rightly contend that merchandising practises of the utility shall not discourage other merchants in the sale of electric devices.

Three conferences between unprejudiced leaders in the principal electric and dealer trade associations have been held during a fifteen months' period, and early in 1928 there was drawn up "A Declaration of General Merchandising Principles." The National Associations participating in the conferences represented the dry goods stores, retail and wholesale hardware establishments, electrical dealers, furniture stores and druggists, in addition to power companies. The principles were approved by the Commercial National Section, and the National Executive Committee, N. E. L. A. The principles are significant in that they are general governing principles laid down by mutual consent as a basis for cooperative competition.

These principles are as follows:

> Since the efforts of the power companies form the only continuous means of promoting the sale of electrical appliances, we believe the best interests of manufacturer, dealer and consumer require the continuance of the merchandising activities of power companies, and that the following general principles should be observed:
>
> 1. All discussions of the problems of the relations of power companies and dealers selling electrical appliances must be based upon proper and adequate service to the ultimate consumer.
> 2. There should be a segregation of the accounting of the merchandising departments of power companies from their public utility functions and all items of expense incurred in the merchandising of appliances should be charged to the merchandising activities.
> 3. It is recognized, however, that expenses incurred in the pioneering of appliances which have not yet met with sufficient public acceptance to be merchandise items in the stocks of local progressive dealers, and general advertising for the development of the market for appliance service, should properly be charged to the promotion accounts of the power companies and not charged to merchandising.
> 4. This conference recommends to power companies and independent dealers the necessity of constructive cooperation in their local fields for the better development of the electrical appliance business.
>
> Lew Hahn, Managing Director, National Dry Goods Association.
>
> Herbert P. Sheets, Managing Director, National Retail Hardware Dealers Association.
>
> Laurence W. Davis, General Manager, Assn. of Electragists, International.
>
> George A. Fernley, Secretary-Treasurer, National Hardware Assn. of the U. S.
>
> Samuel C. Henry, Secretary, Nat'l Assn. of Retail Druggists.
>
> Paul S. Clapp, Managing Director, National Electric Light Assn.

THE Merchandising Committee of the National Electric Light Association gave considerable attention to the demands on the power company for business promotion, and the effects of various selling policies on the independent trades, and after extended deliberations arrived at conclusions which were embodied in "Suggested Standards," and these have been published by our Association as supplemental to the "General Principles." They were designed to assist in quicker acceptance and more accurate interpretation of the principles.

Dealer dissatisfaction, which was expressing itself in numerous communities, indicated that there was an element of incompatibility between the "public interest" and "dealer interest" in the promotion of electric appliances, and the suggested standards of the Merchandising Committee appear to be sound and reasonable middleground on which the utility can proceed without handicap to its paramount duty of selling the public greater utilization of electric service.

In performing this public responsibility for electric service, the power company will strive to promote the welfare of the whole trade. It need not give up appliance merchandising, a practice through which both the public and trade are benefited. On the other hand its merchandising should be on sound business principles which will make it a fair leader. Destruction of trade competition in the sale of electric devices would not be in the public interest, and it is most unfortunate when any selling policy of the power company causes this or creates an impression that monopoly of the appliance selling field is the objective.

A "MIDDLE GROUND" for the merchandising practice of the utility company is "Cooperative Competition" through which the power company justifies its place of leadership in merchandising, adds to the breadth of its service to the public, and while doing this builds a trade good-will which merits an important place in the asset column.

We find a happy situation created by cooperative methods where they have been tried. Cooperative action may be "through the dealer plan," as in Fresno, Cal.; or in the form of subsidiary operation, as in Pittsburgh, Pa., where the Commercial Department of the company promotes for the entire trade, and its subsidiary takes its place in competition with other dealers. But that separate organization is not required is indicated by the Boston plan. There the utility contacts with the dealers in all selling activity, and vigorous merchandising both by the company and dealer is solving the trade problem. In many other power companies between the coastal extremes of Fresno and Boston, the trade is offered encouragement through cooperative activities, yet without slackening selling competition.

That healthy competition is the life of trade is as true today as when first uttered. "Cooperative Competition" is a live and let live policy put into practice. It helps build other substantial merchandising outlets for electric devices. It invites closer acquaintanceship and better understanding, which cannot fail to yield liberal returns as points of contacts are multiplied, because joint effort among those merchandising in the electrical field creates a more sympathetic reaction on the part of the homemaker to the wider use of electricity.

Cooperative Competition will ultimately build a greater and sounder appliance business in the community, because it will build more and better dealer outlets. It is presented as sound merchandising practice for building our domestic appliance load.

Cashocka!

Bass Fishing in the Muskegon River. What a Power Company Did for the Sportsmen

By Ed. Dreier

Reprinted, by permission, from *Field and Stream*

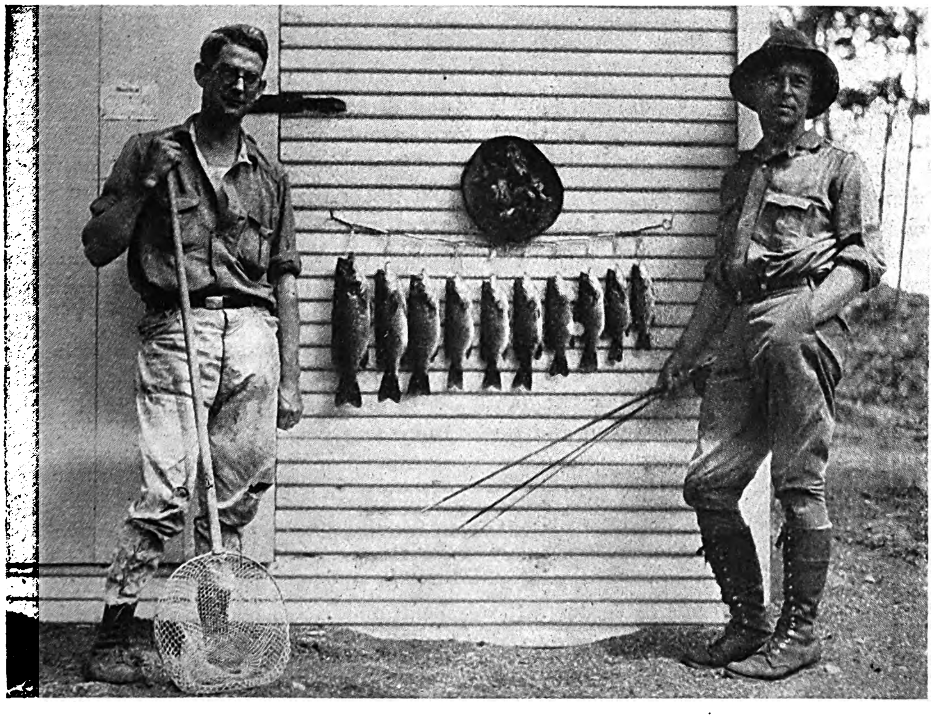
YOU may have heard of the Muskegon. You have, if you know anything about Michigan. A few years ago it was one of the chief topics of conversation and conservation. This river was dammed by the Consumers Power Company, and the Power company was damned by the fishermen. There you have it. The natives raved and swore in all the various languages they knew. Fishermen from other States came in and added their swear words. They taught the natives a lot of new ones that have been handed down from father to son, and even to the females of the species.

Ask some of these folks, "How's fishing on the Muskegon?" and you learn something. You learn words Webster never even thought of. And you don't have to read any books to know the history of the Consumers Power Company. You'll get it, away back to the time the company was first conceived, and you'll get it lurid.

The Power Company Puts Them In

Over 5,000,000 fish including bass, perch, trout, grayling, blue gills and pike have been planted by Consumers Power Company in waters adjacent to company dams in carrying on conservation work.

The Consumers Power Company was serving the people—serving industry. These great waters had to be used for something besides homes for fish. Dams were built and power plants put in. Homes throughout the country were given service. Factories hundreds of miles away used the power to turn their wheels.



—And the Fishermen Take Them Out

Mr. Schopps and the author, with a limit catch made in two and one-half hours with fly rods.

Perhaps it would have been right had the Power company gone ahead and used the water and said, "To —— with the fishermen. They've razzed us to a fare-ye-well. What do we care about them?" But they didn't. Right away they started planting fish in the great back-waters which were created by the dams. Year after year they dumped can after can of fry and fingerlings. They began planting trees along the banks. Thousands upon thousands of trees were planted by the reforestation forces of the Power company.

Operators at the power plants were instructed to keep close tab on the screens to see that fish were not killed by the suction of the waters. Fish ladders had to be inspected. Anglers had to be watched and kept away from these ladders. And each year more cans of fry and fingerlings were planted—increasingly large amounts.

All this time some of the fellows were making their regular pilgrimages down the river from Rogers, from the Big Eddy, from Croton, from Newaygo. There were stories of tackle being smashed; of so many fish being caught that anglers put the smaller fish back into the streams and kept only those going two pounds or more. The skeptics listened and shrugged their shoulders. They wouldn't believe. The fishing had been spoiled.

Ed Schopps, who makes the river trip twenty or thirty times a year, waxed enthusiastic to me about the fishing—told me I'd never go back to lake fishing after one trip down the river. Like the rest of the poor fools, I grinned at him, for I, too, had heard about how poor the fishing was on the Muskegon. And I had been reading in the sportsmen's magazines the stories of all the famous bass fishermen. They talked of streams in Minnesota, in the Ozarks, in Florida and in Canada, but they never mentioned Michigan. So there just couldn't be any fishing worth while in this dammed and damned water of the Muskegon.

HERE ARE THE FACTS

on municipal operation of light and power utilities in the United States.

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BUT I went because I like Ed Schopps, and in my heart I had the feeling that there would be a good laugh at the end of the trip and it wouldn't be on me. We slid the boat down the steep bank and into the foot of the Big Eddy about seven o'clock one fine morning. The fly rods were set, and I tied on a deer hair mouse to try in the slow water of the eddy. Ed pulled away from the shore, and I carelessly tossed the mouse out to strip some line. There was a swirl, and I sat there petrified—the biggest case of buck fever a man ever had. I saw that fish spit the mouse out. What's the use of telling you how big he was?

The rest of the eddy brought no response, and I switched to a feather minnow. Just above the first rip I put the minnow on shore, and as he slid into the water there was an explosion.

"Cashocka!" yelled Ed, and he pulled into the current.

Six times that fish went into the air before he hit the rips. We dropped anchor and eased the boat down through for nearly two hundred feet. We netted him in the quiet water below. He weighed 3½ pounds.

Two hundred feet below, another shore cast brought a smother of spray, but I was too eager, and we had to go on. Ed never goes back for a fish when he misses. That one is left for another day. We took a two-pounder just a little farther on. He was a sulky brute—just wouldn't come up until the pressure of the rod got so great that he had to, and he fought all around the boat before we slid the net under him.

Ed got the next three fish in three casts, and I took two more—all in less than half a mile. At noon we had eight fish, with three-quarters of the way still to go. Two more were picked up in less than half a mile, and we were done for the day.

We raised two rainbows shortly after that and missed both of them. One would have been good for four or five pounds, while the other would have gone two. I know there are rainbows in that stream, because I watched the conservation men transferring fish weighing up to eighteen pounds from the dam at Newaygo to the waters above Croton, and on the same day we fished for bass some one below the dam got two rainbows, one of seven and the other of five pounds.

There are wall-eyes that give one a mighty stiff battle in the swift water, and it is common for the anglers below the dam to get fish up to eight pounds and more. Ed Schopps came down the river twenty-five times last year, and his companions had their limit on almost every trip, the largest bass going over six pounds. When you get a six-pound small-mouth in the fast waters of the Muskegon, you have something that leaves a thrill for many a day, if they fight anything like the two-pounders.

Almost everybody in Grand Rapids knows Ed Schopps, and Ed knows the river. He knows just where to put the lure to get a strike. He will tell you the days when you will and when you won't and direct you to guides who know the river and love it the way he does.

Maybe some day you will want to fish this river that was "spoiled" by a great power company. I wish some of the other streams were spoiled like this one. What a fisherman's paradise they would be!

NEARLY every line of business is organized in a trade association and nearly every city has its chamber of commerce. The one form of organization is to advance the interests of a particular line of business or trade and the other to advance the interests of a city or town. And through such association we are learning about the humanities, about economic facts and ethical conduct, and it makes for improved method and—more certain accomplishment.—*Colvin Brown, U. S. Chamber of Commerce.*

James H. McGraw Prize Paper

Industrial Electric Heat

By B. M. Riker

Editor's Note: Mr. Riker's paper won the James H. McGraw first prize for 1927-1928, awarded last June at the 1928 N. E. L. A. Convention at Atlantic City. Its length makes it impracticable to publish it in its complete form in the N. E. L. A. Bulletin. The following abstract prepared by A. B. Morgan of N. E. L. A. Headquarters Staff will indicate the scope of the paper. The complete paper will be loaned to anyone desiring to study it, upon application to the Secretary, National Electric Light Association, 420 Lexington Avenue, New York, N. Y. Mr. Riker, the author, is with the Commercial and Industrial Department of Charles H. Tenney & Company, 200 Devonshire Street, Boston, Mass. The paper is divided into the following sections, of which the foreword is printed complete:

- Foreword
- Industrial Electric Heat
- Fundamentals and Heat Calculations
- The Advantages of Electric Heat
- As It Affects Costs and Production
- Heating Equipment
  - a. Melting Pots
  - b. Industrial Ovens
  - c. Metallic Resistor Furnaces
  - d. Melting Furnaces
  - e. Impregnating Tanks
  - f. Electric Welding
  - g. Miscellaneous Heating Equipment
  - h. Control Equipment
  - i. Commercial Cooking Equipment
- Annealing of Non-ferrous and Ferrous Metals
- Glass Annealing
- Heat Treating of Steel
- Galvanizing and Sherardizing
- The Heating Engineer and the Central Station Sales Policy
- Conclusion

Foreword

"THE interesting story of the electric light and power industry, and of other industries that have played a major part in the progress of civilization, might well be set up as a series of developments. And, it is interesting to note that in passing from one stage to the next, the cost item has not been a vital factor.

"This is well illustrated by the fact that in replacing the horse with the automobile, horse cars with the modern street railway system, kerosene lamps with the electric light, etc., etc., there has been a material increase in cost in each instance. Nevertheless, improved processes and superior mechanical devices have found, and will continue to find, warm welcome awaiting them simply because the advantages and conveniences which attend their adoption easily overbalance the cost factor on the scales of commerce and industry.

"The manufacturers of today, ever awake to the importance of constant improvement in the quality of their products have brought about a demand, hence, a rapid development of electric heating apparatus. The advantages inherent to the use of electricity as a heating medium are daily becoming more obvious to them and to their trade as well, who are in turn demanding electrically treated products.

"The introduction of electric heat has set up new standards of comparison in industrial production and has been responsible for actual operating results that have hitherto been considered impossible. It has brought about the organization of a swiftly increasing number of Industrial Heating Sales Departments within the central stations, and made provision for the training of engineers and salesmen who can extend this new branch of central station service into industrial centers.

"It is likely, indeed, that when the story of electric heat has been completely unfolded, it will parallel closely that of the electric motor, which, when introduced to industry as an economical and reliable source of mechanical power, bumped squarely into industrial traditions, intrenched behind barbed wire barriers of generations of antiquated shop practice. The electric motor came into its own because its advantages were so obvious that industry demanded it. Once placed, it acted as a superior salesman for more of its kind. The electrically operated heating equipment of today is making its place in very much the same manner.

"We may well point out here, that from the viewpoint of the central station, electric heating load should be classified as a load of exceptional character. It quite often is of a continuous nature, comes on during the off-peak period, and maintains a high power factor. Further, it shows a much greater consumption per kilowatt connected and, subsequently, a greater return on plant investment than the ordinary power load."

Industrial Electric Heat

In the Section entitled, "Industrial Electric Heat" the wide application of the use of electricity is summed up as follows:

"There is hardly an article of commerce today that is not subject at some stage in its production to heat treatment. Practically every shop, factory, and industrial plant is a prospective customer for heating apparatus; and each day brings to light some new operation where the application of electric heat will prove advantageous.

"The chronological development of the use of electricity to the various types of heating is also covered in this section and it is pointed out that less than 10 per cent of the field of application of electricity has as yet been developed."

Fundamentals and Heat Calculations

The Section on "Fundamentals and Heat Calculations" contains practically all of the formulas which the average industrial engineer will find of value in his work. Each formula is accompanied by descriptive text giving the application of the formula to the daily problems encountered by the industrial engineer.

Advantages of Electric Heat

The Section covering "The Advantages of Electric Heat" tabulates the following items wherein the use of electricity is a distinct advantage:

ECONOMIES

1. No fuel or ashes to handle.
2. Automatic control reduces labor factor.
3. Lower maintenance.
4. Better quality product.
5. Increased production through shorter heating cycle.
6. More uniform products through heat regulation.
7. Fewer rejections.
8. Definite heat treating data can be obtained.
9. Repetition of results.
10. Improved working conditions.

11. *Lower insurance rates (elimination of fire hazard).
12. Lower accident rates.
13. Better plant arrangement and saving of floor space.

IMPROVED EFFICIENCIES

1. From labor.
2. From material.
3. From apparatus.
4. Less heat loss.
5. Better power factor.
6. Some processes cannot be successfully done with other forms of heat.

It is apparent that when the above items are taken into consideration the comparative costs of fuel are merely incidental and should not be used as the sole basis of comparing electricity with other forms of energy. This section also includes definite examples which indicate that these advantages are not theoretical, but actually result in an appreciable saving in the over-all cost of production.

Heating Equipment

The Section on "Heating Equipment" includes detailed information on the design and operation of Melting Pots, Industrial Ovens, Metallic Resistor Furnaces, Impregnating Tanks, Electric Welding Equipment, Miscellaneous Heating Equipment, Control Equipment and Commercial Cooking Equipment.

Under the heading "Melting Pots" the general formula for the calculation of energy required is given as follows:

$$KW = \frac{W}{3412}\,\frac{(Sp \times Tr)}{(t)} + Lt$$

W = weight of materials
Sp = Specific heat of material
Tr = Temperature rise in deg. F
t = time in hours
k = Thermal efficiency of pot
Lt = Latent Heat of Fusion in B.t.u. per pound

The values for the various metals which enter into the formula are given in the following table:

Material	Weight Lbs. Per Cu. In.	Specific Heat	Latent Heat of Fusion in B.t.u. per lb.
Lead	0.412	0.041	10.6
Tin	0.264	0.058	25.0
Copper	0.323	0.96	77.4
Zinc	0.259	0.94	41.6
Aluminum ...	0.0927	0.219	175.0
Type Metal ..	0.37	0.0388	31.8
50-50 Solder .	0.341	0.043	27.5
Bismuth	0.354	0.031	22.8
Cadmium	0.311	0.056	24.6
Antimony ...	0.243	0.051	72.5

Following the general Division on Melting Pots, the application of the electric melting pot to solder, lead, tin, babbitt, and type metal is covered in detail.

The Division on "Industrial Ovens" lists the following as representative of the field in which the Industrial Oven is widely used in drying and baking processes:

Japanning, Core Baking, Chemicals, Silver, Grinding Wheels, Cereals, Bread and Pastry, Porcelain Drying, Coils, Armatures, etc.

The design and operation of ovens for application to the uses enumerated above are covered in detail. Numerous illustrations covering actual installations are also included.

The Division covering "Metallic Resistor Furnace" includes details on the design and construction of the heating elements and also of the complete furnace. The Box, Car, Lift, Elevator, Pusher, Conveyor, Rotary Hearth and Vertical or Pit type furnaces are also included. The application of electric heating to Vitreous Enameling is also covered.

The Division covering "Melting Furnaces" includes the Direct Arc, Indirect Arc, Induction and High Frequency Furnaces. The advantages of the use of electric melting furnaces are enumerated as follows:

1. Gases over the metal are eliminated.
2. Exact control of atmosphere.
3. Metal may be made close to analysis due to the control of air supply.
4. Decreased metal loss.
5. Alloys may be added to the furnace instead of to the ladle.
6. Speed of production is increased.
7. Superior quality of the product.

This section deals with both Steel and Non-ferrous Metals.

The Division on "Impregnating Tanks" covers the design and operation of this type of equipment when used for the impregnation of coils, transformers, cables, etc.

The Division on "Electric Welding Equipment" describes Resistance, Arc, Automatic and Atomic Hydrogen Welding methods.

The Division covering "Miscellaneous Heating Equipment" includes such items as Cartridge Heaters, Glue Pots, Compound Melting Pots, Soldering Irons, Space Heaters, The Immersion Heater, Steam Boilers and Singeing Equipment.

The Division on "Control Equipment" lists the essential characteristics of heat control apparatus as follows:

1. The instrument must indicate or record easily to within the required accuracy limits.
2. The control contacts should be sufficient in size to carry the current of the relays, as arcing at such points is detrimental to satisfactory operation.
3. The control equipment should be so constructed that any parts subjected to excessive wear may be easily and quickly replaced.
4. The thermo-couple must be so constructed that it is sufficiently sensitive to register temperature changes corresponding to the required accuracy.
5. Finally, the thermo-couple should be given a proper location within the furnace so that the most accurate results will be realized.

The design and characteristics of thermo-couples and their application to millivoltmeter and potentiometer controllers are covered in detail. The results which may be expected from accurate and reliable control are listed as follows:

1. Duplication of firing conditions, and absolute pre-arrangement of schedules.
2. Simplification of firing over periods of varying lengths.
3. More accurate firing standards.
4. Better operating conditions with improved morale of the operators.
5. Appreciable savings in time and labor.
6. Lowered fuel consumption.
7. Fewer (in some cases no) rejections.
8. Lower maintenance.
9. Improved uniformity and quality of product.

The Division covering "Commercial Cooking" treats the application of electricity to restaurants, hotels, tea-rooms, etc., and indicates that the field represents a potential connected load of 3,000,000 kw.

Annealing of Non-Ferrous and Ferrous Metals

The Section on "Annealing of Non-Ferrous and Ferrous Metals" covers the design and operation of (1) The Kenworthy Non-oxidizing, The Conveyor Type Copper Annealing and The Box Type Copper Annealing Furnaces for use in the Annealing of Copper. (2) The Box Type, Tunnel or Pan Type, Roller Hearth and the Conveyor Type for Brass. (3) The Box Type, Car Bottom Type, Conveyor and Pit Type Furnaces for Annealing of Aluminum and (4) The Car Bottom Type for Annealing Steel and Iron Castings.

Glass Annealing

The Section on "Glass Annealing" covers the design and operation of the various types of lehrs. It indicates that the time of annealing is materially shortened, the product is greatly improved, and the percentage of rejections is either lowered or eliminated altogether.

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*A group of associated insurance companies have recently stated that in the case of a building occupied by a bakery, using electrically heated ovens, the annual net saving to the policy holder would be from 14 to 18 per cent, dependent upon the type of building construction.

Heat Treating of Steel

The Section on "Heat Treating of Steel" includes a description of the various processes involved in the design and operation of equipment used in Hardening, Drawing, Carburizing of Steel and Aging of Cast Iron.

Galvanizing and Sherardizing

The Section on "Galvanizing and Sherardizing" covers the design and operation of equipment for zinc coating of iron and steel. The advantages of electric heat for this work (as compared with a fuel-fired tank) are listed as follows:

1. Constant temperature 24 hours per day.
2. Less heat loss, no loss due to expelled gases.
3. The dross is cut to 1/5 to 1/8.
4. The life of the tank is greatly increased due to the uniform distribution of the heat.

The Heating Engineer and Sales Policy

The Section on "The Heating Engineer and the Central Station Sales Policy" points out that the heating engineer must be thoroughly familiar with the process under consideration and in addition must be liberally endowed with an understanding of diplomacy. The necessity of a systematic schedule is also stressed and according to the author this should include (1) Analysis of the Heating Field, (2) Formulation of an Active Sales Plan and (3) Application of the Sales Plan. In the case of a combination gas and electric company it is advocated that the sales policy should be determined largely by the requirements of each customer and it is strongly recommended that the respective studies covering gas and electricity be judged by an impartial referee in the central station organization to the end so that the customer will get the service which is best suited for his individual needs.

Conclusion

The Section entitled "Conclusion" is quoted directly from the report as follows:

"It has been the object of this paper to trace briefly the fundamental principles of electric heating and to touch upon the essentials of the more common heating processes. We have further endeavored to illustrate, both generally and specifically, the outstanding advantages of electricity when utilized as a heating medium.

"There are, however, a tremendous number of special applications that we have not touched upon. They are, as a rule, applications of widely varying characteristics, common to a specific locality or industry, made possible by the design and construction of special apparatus and by the receptive attitude of alert industrial executives to new and modern methods. Such applications will continue to present themselves in the future just as they have in the past, and the ability of the heating engineer, together with the equipment manufacturer, to determine the economic possibilities of these installations and to cooperate in the design of efficient equipment will be an important factor in placing the electric heating load on par with the electric motor load during the next decade.

"Much has been accomplished during the past fifteen years toward stimulating the demand and improving the supply in this new electrical market. The responsibility of future development lies in great measure with the central station. The advantages of this field to the electrical industry have been emphasized elsewhere in this paper. Outstanding among them is the fact that electrical apparatus of such character will go a long way toward increasing the central station revenue component, when operated on our distribution systems. The market, as a whole, presents a most attractive aspect, and its potential worth is only limited by the amount of effort expended in its promotion."

Electricity in the Household in 1890

In an article entitled "Electricity in the Household," by A. E. Kennelly, one time assistant to Thomas A. Edison and at present Professor of Electrical Engineering at Harvard University, appearing in the January, 1890, issue of *Scribner's Magazine*, the statement was made that "the adoption of electrical household appliances is daily becoming more widespread, here adding a utility and there an ornament, until in the near future we may anticipate a period when its presence in the household will be indispensable."

As confirmation of his prediction, an article under the same title by the same author appears in the April, 1929, issue of the same magazine. This latter article is an account of the advancement made in the past forty years of the art of generation and distribution of electric service with particular reference to its application to domestic use. Readers of the BULLETIN are familiar with the essential facts brought out in the 1929 article and without doubt will concur in his prediction for the next two score years. Dr. Kennelly wrote, "The last forty years have seen a very great development of electrical service in homes and factories. There seems to be no reason why the next forty years may not witness a continued and correspondingly great advance. As we look to the future, the electric switch is still in the ascendant."

From the contemporary standpoint the early article is most interesting for its enumeration of domestic appliances then either in actual or experimental use. "The first application of electricity to household purposes," says Dr. Kennelly, "was presented by the electric bell, early in the century, and annunciators of various kinds soon followed. For many years this was the only convenience it afforded, but the discoveries of the telephone, the electric light, and the electric transmission of power within the last thirteen years have given it a tremendous impetus whose ultimate consequences are not yet within view. Even if, as seems unlikely, these brilliant achievements are destined to stand alone, not succeeded by further discoveries, many years must elapse before their full use shall have been reached; just as in the case of the pianoforte, which took more than a hundred years from its first invention to become the common guest we find it in the household of today.

"In the same way motors have been applied to lawnmowers, to carpet sweepers, to shoe polishers; and, in fact, there is no household operation capable of being mechanically performed, of which, through the motor, electricity cannot become the drudge and willing slave. It has even been applied to serving at table."

Among other uses mentioned were electric coffee pots, clocks, fans, elevators, footwarmers, pumps in country houses, time detectors for watchmen, fire alarms and automatic regulation of temperature by thermostat.

The Westinghouse Lamp Company's New Lighting Institute

By A. E. Allen

Vice-President, Westinghouse Lamp Works

THE Westinghouse Lighting Institute—a complete city block of buildings comprising a model electrical home, stores, factory, school, theater, central station sales office, department store, with streets, roadway and modern street lighting units—is being built on the seventh floor of the Grand Central Palace, a building which itself covers a square block in New York. The institute will be formally presented to the electrical industry by the Westinghouse Lamp Company on June 1, 1929, just prior to the Atlantic City Convention.

The institute is designed as a Laboratory of Light, an educational institution dedicated to the study and teaching of correct lighting practice, a meeting place for scientists, engineers, architects, designers; in fact, all who are interested in the application of artificial illumination to the modern arts and sciences.

Here the industrial engineer may present his plans for the erection of a manufacturing plant, receive advice or check his own lighting specifications, verifying his calculations by actual demonstration and measurement of light output from various types of lighting units. Here the architect may study and visualize through scaled models the flood-lighting of proposed buildings for the purpose of enhancing its architectural lines by night. Here, also, may come the student from technical school or college, the lighting engineer from the public utility, the designer of lighting fixtures, the editor of magazine or trade paper, the merchandise manager of the central station or the dealer in lamp and lighting equipment, each to inspect, study or have demonstrated to him according to his individual interest any of the thousand applications of incandescent lamp lighting, whether it be in the home, commercial or industrial field.

Demonstrators, guides and technical advisors will be available to individuals or groups who may wish to inspect the exhibits, study particular pieces of lighting apparatus, or attend classroom lectures and demonstrations of modern lighting equipment.

An auditorium with a seating capacity for three hundred and fifty persons is a feature of the Lighting Institute, and this will be available for meetings of central station groups, jobber and dealer conferences, as well as for regular meetings of scientific and engineering societies. Current facilities of very wide latitude have been installed so that scientists and research engineers will have every available assistance in their lectures and demonstration work. In fact, the entire equipment, electrical and otherwise, throughout the Institute is of the very latest design, and while the greater part of it is commercially standard, many novel and interesting devices indicate the trend and future application of lighting equipment of which little is familiar to the general public at the present time.

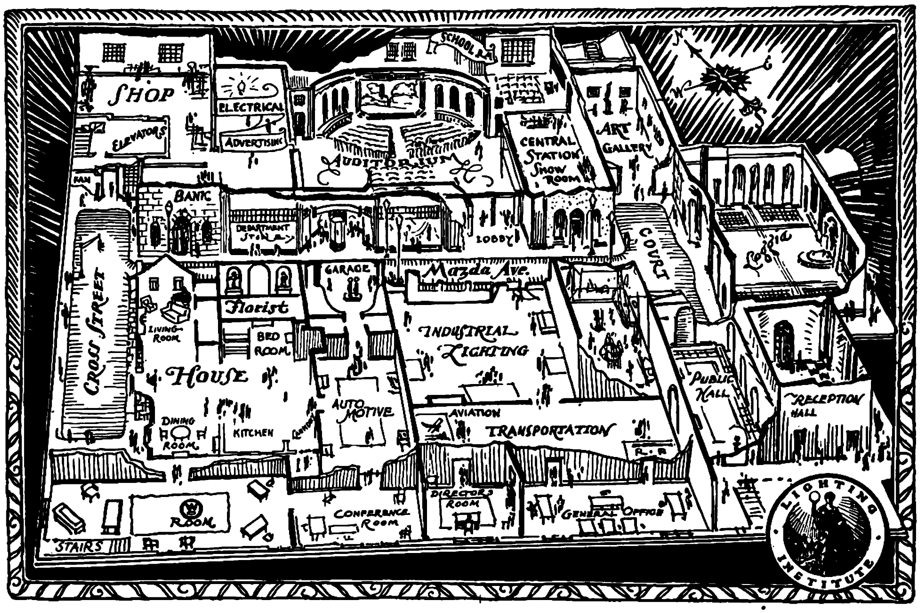
The floor plan of the Lighting Institute is an interesting layout combining many aspects of commercial and industrial activity with the more æsthetic atmosphere of the model home, salon and art gallery. Through the center of the exhibit section runs a twenty-foot street, Mazda Avenue (one hundred and eighty feet long with a cross street at one end and a court at the other). Facing on Mazda Avenue, which is lighted by modern street lighting units, are store fronts of various kinds, including a sixty-foot department store window and entrance. Also there is located on Mazda Avenue a garage, industrial building, theater, bank and fully equipped central station, and electrical dealer merchandising establishments.

Back of the windows and store fronts on Mazda Avenue are located the special exhibits and demonstration rooms covering particular fields of lighting endeavor. Behind the bank front lies the section devoted to electrical advertising wherein are exhibited in working models all the various lamps, reflectors, housings, color lamps, and other paraphernalia for producing the marvelous effects attained in the electric sign industry, finished examples of which are to be seen in operation on Mazda Avenue.

Behind the garage front with its Island Filling Station lies a large section for the testing, focusing and measuring of automobile headlights as well as complete exhibits covering every type of miniature Mazda lamp now manufactured—medical, flashlight, toy train, radio panel, etc.

Next to the garage the visitor to the Lighting Institute finds the Industrial Lighting Section, and behind that a

(*Continued on page* 295)



LAYOUT OF THE LIGHTING INSTITUTE

Service Suggestions
NATIONAL ELECTRIC LIGHT ASSOCIATION — COMMERCIAL NATIONAL SECTION
CUSTOMER RELATIONS COMMITTEE
H. T. EAST, *Chairman,* Public Service Co. of Northern Illinois, Chicago, Ill.
To formulate efficient methods of conducting relations between the customer, the public and the supply company, including such matters as taking applications in the office, forms, order routing, inquiries, complaints, meter reading, collections and credits

No. 71 May, 1929

Correspondence for Good Will

By JAMES F. RICE

Correspondence Advisor, Commonwealth Edison Co., Chicago, Ill.

THE average letter is subject to condemnation on many charges, but the principal reason for its indictment is its tenacious hold on the clammy construction and impersonal tone that were so evident in the commercial correspondence of men long dead and almost forgotten.

"Almost forgotten" is a highly appropriate phrase because the wornout forms of expression that glorified the epistles of pen-and-ink days still blossom serenely in the grooved minds of the many "we-beggars" who "wish to advise" that something "will go forward in due time," and "trust" that the "same" will be satisfactory, and "beg to remain" watchful waiters who "hope to be favored" with something or other "by return mail." This quite typical language, which might be described as the kind that comes in cans, neither carries an air of conviction nor contributes anything worthwhile to the tone of a letter. It is bad enough in itself but it leads to something worse—a stagnant point of view, with eventual loss of originality, and the habitual substitution of strained utterance for the sincerity and ease of natural speech.

The Happy Medium

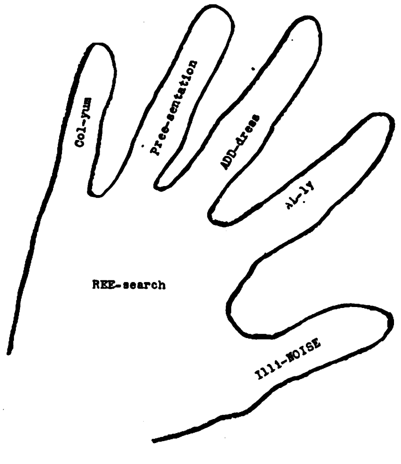
The final effect becomes evident in stilted language by which time and space are frequently wasted when the dictator of correspondence has lost all appreciation of conciseness. Extreme brevity is, of course, utterly undesirable, but there is a happy medium between word-waste and brusqueness. It is called "brevity with completeness," a modern method of expression that certainly does not emanate from a careless acceptance of bad practices established by others. "Do men gather figs of thorns, or grapes of thistles?"

Specimens of Bulletins issued periodically to dictators of correspondence, stenographers and typists throughout the Commonwealth Edison Company.

Correspondence Bulletin No. 181

A HANDFUL OF FLIES

There are still six troublesome flies—gross mispronunciations in the balmy air of Edisonia. Let's exterminate them while we have them well in hand.



(As we were saying, a good dictionary is a good friend.)

Correspondence Bulletin No. 227

REACHING FOR THE SKY

Plain language, such as we use orally, is the language for letters. It is perfectly ridiculous to mount a ladder and try to pull oratorical splurges out of the clouds. The splurge doesn't usually pay for the stress and strain. It is more likely to have the effect of laughing-gas.

"All of our men commissioned to solicit orders from our customers have credentials properly authenticated."

In English:

All our salesmen carry identification cards.

With the advent of the typewriter and the operator trained in the new language of shorthand, came a great opportunity to make the business letter talk. The average dictator did not rise to the opportunity. The beginner, stepping into the shoes of a fellow-worker who has gone a step higher on the ladder, has become merely a faithful follower of forms bequeathed to him in great unselfishness by his climbing predecessor. And when, in his turn, the heir to all the moth-eaten phrasings of past ages has received his call to a higher place at the table of business activity, the fullness of his human heart has prompted him to hand down his collection of scraps to another struggling beginner. This "hand-me-down" process has been one continuous round of pleasure. So the history of business correspondence may be summed up in a line taken, appropriately enough, from "Love's Labor's Lost":

> "They have been at a great feast
> of languages, and stolen the
> scraps."

More Art Than Science

Some speak of improving letters and others of "personalizing" them. Both have the same idea. The old form of letter, still so common in the business world, is nothing more or less than a collection of stilted expressions, showing no individuality and consequently little, if any, personality. Personalization of letters depends to some extent on practice, because letter writing is admittedly rather art than science, but those who have given little or no thought to the subject of correspondence are too ready to look upon letter writing as an art and to remain in ignorance of the fact that a letter may be, to some extent at least, a product of science. It would be absurd to say that letter writing is in any way scientific in the literal meaning of that word, but, as science may quite properly be taken to mean "exact knowledge," there can be no doubt that some scientific principles are applicable to letter writing.

Emphasis of this point is justified by a prevalent tendency to regard letter writing solely as an art. This notion, harmless as it seems, leads many people to the deplorable conclusion that writers are born—not made. Nothing could be farther from the truth. It will be admitted readily enough that writers of great sales letters may have natural endowments that the rest of us do not possess, but it is an entirely reasonable contention that anybody with a fair knowledge of our language can learn to write good letters. Unquestionably, anybody can at least make noteworthy progress in the improvement of his letters if he does nothing more than to overcome his addiction to "stone-age stuff"—forms and phrasings whose only claim to respectability is their white whiskers.

The Vitalizing Process

From a survey of correspondence in almost any organization, it might appear almost impossible to vitalize the business letter without "making the writers over." But the situation is not quite so bad as it may appear. The vitalizing process consists partly in the elimination of what is bad and partly in the introduction of what is good in form and substance. Dictators are normal men and women, with the natural fund of common sense that all mortals possess, and with a ready responsiveness to reasonable suggestion—when their interest has been aroused. More often than not, even a fruitful suggestion needs only to take the form of a reminder to bring substantial results. This is true because carelessness in everyday practice becomes so much a matter of habit that it is a much greater factor than downright ignorance. A rather pleasing proof of this is found in the eagerness of many stenographers to aid in the application of guiding principles given to dictators and in their ready remembrance of prohibitions issued to dictators. The primary cause of poor letters, in a word, lies in the simple fact that men and women engaged in the production of letters have given too little thought to the importance of the capacity in which they serve as producers. They underestimate the importance of letters and the writers of letters. They fail to realize that a letter is intended to be the natural, forceful utterance of an intelligent individual and not merely a rickety vehicle for the drayage of all the stilted and hackneyed word combinations that our ancestors placed in cold storage.

Correspondence Bulletin No. 205

THE FORCE OF DIRECT UTTERANCE

Nobody would walk around the block to cross the street, except, perhaps, some dreamy Romeo. But some of us habitually wade around in words when we have something simple to say.

COMPARE THIS	WITH THIS
In reply to your letter of May 2, with which you returned a bill for $3.89, we inclose a corrected bill for $2.71.	The inclosed bill for $2.71 is to replace the one you returned May 2.
With regard to the meter measuring your service, I can assure you that it is accurate.	Your meter is accurate.
I inclose a check for $1.25 representing the admission fee paid by John Blank in connection with application for membership in the Association.	The inclosed check for $1.25 is to refund the admission fee paid by John Blank with his application for membership.

Notice the easy elimination of *unnecessary* I's and We's.

That is ONE of the virtues of direct utterance.

Correspondence Bulletin No. 5

CARELESS USE OF WORDS

When typewriters were not in general use and business letters were written by hand, every expedient was employed to make them brief. The word SAME was apparently considered desirable from this point of view. But, although the original reason for extreme economy in word usage no longer exists, this valueless word is still used persistently. Unfortunately the fact that it might tend to obscure the meaning of a sentence has always been overlooked.

Consider this typical letter of acknowledgment:

"In reply to yours of the 3rd inst., relative to the shipment of merchandise recently ordered and requesting one of our catalogues, we are pleased to say that the same will go forward tomorrow."

Will both the merchandise and the catalogue be sent?

* * *

How does this impress you?

"The full rate portion on the February bill was figured at 36 Kilowatt hours, and on the previous bill at 40 Kilowatt hours. We are, therefore, at a loss to find where any injustice has been done, and are returning same with the discount date extended."

Is the *injustice* being returned?

* * *

It may be asserted that the meaning in both these letters *will not* be misconstrued. But the ideal letter is the one in which the meaning *cannot* be misunderstood.

It is proper to say: "We enclose your light and power bills, which are for the same period." But we should not say: "We enclose your light and power bills. The *same* are for the month of May."

Correspondence Bulletin No. 160

CONSUMPTION

Consumption is a disease with which electricity is not afflicted.

Those who USE electricity for light or power do not CONSUME it. It is not a fuel or a food. It is not burned up or eaten. It is merely USED.

When we sell a customer electric energy, we sell him something he can and does put to work—not merely something to consume. Consequently, we broadcast a false idea when we speak of "electricity consumed."

"Electricity USED" has sales value. It is a reminder to the customer that he is buying or has bought a USEFUL service, and not merely a load of smoke for his chimney.

Let's abandon "electricity consumed" and "current consumed." and take up ELECTRICITY USED.

Correspondence Bulletin No. 151

THE DETACHABLE FINGER

Do you think any ordinary person can practice two kinds of etiquette? If a child is permitted to use his knife as a carry-all at his own table, will

Improvement Must Be Systematic

The improvement of the business letter is very much like the saving of money: the attempt must be made systematically, and the process is bound to be slow. Spasmodic efforts will be unavailing. On the other hand, a too-intensive criticism will fail to generate interest in an endeavor for which real cooperation is required. The problem is very plain: commercial correspondence must be improved. The only difficulty is to find a method that will give a fair promise of sustained success.

Several years ago the Commonwealth Edison Company made a comprehensive survey of the correspondence situation, and established an advisory system to work upon the two prime factors of letter composition—the dictator and the stenographer. The system was made essentially advisory, rather than supervisory, because the experience of pioneers in the practice had shown unquestionably that help will be received graciously by any progressive employee, but that criticism will be conducive to an attitude of cold resentment. It was felt that advice might be given on a wholesale basis, even under a coercive policy, but the opinion prevailed that any silent opposition to forceful methods would make it difficult to learn the needs of individuals or to enlist their cooperation in constructive measures.

Advisory Service for Correspondents

With an entire absence of unfriendly criticism, therefore, the method instituted and now in operation consists of an advisory service for all dictators of correspondence, as well as stenographers and typists, in the broad principles of correspondence, the solution of difficulties, the correction of undesirable mannerisms, the standardization of set-up, and the elimination of the grammatical and rhetorical errors that are so prevalent in the speech of the day. Advice of general interest that may be regarded as profitable to those involved in any form of correspondence is broadcast in bulletins. Suggestions to individuals are sometimes made in letters and informal notes, but, quite frequently, a personal contact serves better to bring home to the dictator a full realization of some serious defect to which he has fallen victim.

Experience has shown that a short bulletin will be read carefully if it has human interest. Like a letter, it must be a message from one human being to another. It may be, objectively, the product of a duplicating machine, or printing press, but it must have the substance of personal utterance. As a competent physician prescribes specifics rather than patent medicines for specific ailments, so one who hopes to advise dictators effectively must make bulletins specific. This point of view seems to have been proved sound by a sustained interest in bulletins, as evidenced by the duration of favorable comment and the frequency of requests for advice, even in personal correspondence.

Short and to the Point

The desirability of conciseness in a bulletin is so great that it virtually amounts to necessity. First of all, those who read bulletins are busy people who could not reasonably be expected to welcome a lengthy dissertation on any subject. But a more important consideration is that a bulletin, to produce its best effect, must present to the reader some thought that he can grasp quickly. It is all well enough to hope that those who receive bulletins will preserve them for occasional reference, but little is accomplished if the readers do not derive some benefit immediately. It is quite obvious that some one point, presented in a reasonably interesting way, will be absorbed readily by a reader, who is all the more likely to preserve the bulletin and to remember the lesson than he would be if it were to treat several subjects, at a necessarily greater length. It must be remembered, too, that bulletins are sent to high executives, who undoubtedly receive some little benefit occasionally and who may, with little loss of time, maintain a fair degree of familiarity with the nature and the extent of correspondence advice being given to the workers under their jurisdiction.

he use a fork when he is "out in company"? You know the answer.

If you write slipshod sentences in an interdepartmental communication, such as an accident or damage report, do you imagine that some miracle will enable you to write ENGLISH in a letter? That is one miracle you will never see.

Some of our descriptions of accidents and damages would make good material for the vaudeville stage. Just look at this sparkling gem:

"After a few days, his finger became infected and was sent to the office by his foreman to see the doctor."

There's efficiency for you. An injured finger is simply mailed in for repairs, and another "no-lost-time" accident goes into the record.

Correspondence Bulletin No. 201

THE CASE AGAINST "BIG WE"

The indiscriminate use of WE inevitably results in unnecessary and unpleasant use of this pronoun. But, although it is bad enough to make a letter lopsided with WE's the final outcome of the WE habit is the WE attitude—a mental poison.

The following WE utterances are taken from ONE letter:

1. "We are replying to your letter." —An unnecessary use of WE. A poor beginning: a waste of time and space to say nothing.
2. "We want to state."—An utterly useless expression. Just wordiness, to say the least.
3. "We were correct." — The WE ATTITUDE, resulting from needless use of the pronoun. A disagreeable emphasis of OUR position.
4. "We have not made an error."—The WE ATTITUDE again Needless self-justification.
5. "We hope this is satisfactory."—Once again WE are greatly concerned about OUR convenience.

You cannot escape the WE ATTITUDE if you begin most of your letters with WE, and frame about half of your utterances to express what WE think.

Correspondence Bulletin No. 202

THE I's HAVE IT

Mr. Huson, a writer for *Postage & The Mailbag*, gives an excellent word-picture to illustrate his opinion of the WE attitude:

Jones meets Smith on the street one fine morning. He grasps him by the hand and says: "Good morning, Smith; I'm feeling fine this morning. I was a little under the weather last week, but I'm all right again."

"The only thing wrong with this little speech," says Mr. H., "is that no gentleman ever greets a friend by telling him the state of his own health. Usually, he at least assumes an interest in his friend's condition, and greets him like this: 'Good morning, Smith. How are YOU this morning?' "

Now, look at these eight little I's in a small playground known as a paragraph:

"*I* regretted very much that *I* was unable to be present at the conference you called at your office. Unfortunately, *I* was called to a meeting and *I* was unable to get away in time to be present with you. *I* left word with Mr. Brown that if *I* was detained, he was to attend in my place, as *I* knew that he knew as much as *I* did of the details of the matter."

Would these I's look small to a reader, or would they seem BIG?

Correspondence Bulletin No. 142

THE LONG SENTENCE CRAZE

"Mr. Jones was working at Black and White Streets when a steam-grader owned by the Blank Paving Company, which was traveling south on Black Street, when a clutch-band broke, tearing the housing loose, striking John Brown, 8300 Madison Avenue, a helper on the steam-grader, in the left leg, suffering a deep wound which bled profusely."

SOME accident. "The tale of a Suffering Clutch." The bleeding must have been like the alleged sentence—profuse.

"Both men were thrown from the

Many of those who receive the bulletins preserve them. To facilitate filing and reference, as well as the use of an index, every bulletin bears a number and a subject. Matters pertaining directly or indirectly to letter writing are treated under subject headings intended to attract notice and to emphasize the points under discussion. Some of the typical subjects have been:

From the Ark to the Wastebasket
Trustful Souls
Tinker to Evers to Chance
The Rubber Stamp Idea
Talking Turkey
Weak Sisters
One Party We Should not Attend
Old Hobby-Horses
Quick, Watson, the Dictionary!

Public Utility Correspondence

It is fairly evident that a public utility differs somewhat from an ordinary business institution. Its contacts with the public are more varied, and it is held accountable for many acts or omissions even by those who are not its customers. The public utility serves the largest public that is served by industry and depends more than any other business enterprise on widespread good-will. Although the utility is usually non-competitive and distributes or provides a universally necessary product or service, and consequently has comparatively little need of what are commonly called sales letters, it has before it always the inescapable necessity of selling good-will in every letter sent to anybody.

The letters issued by a public service corporation naturally differ in some essential respects from the letters of even a relatively large mercantile establishment. The most outstanding inherent difference is apparent in letters having to do with matters of credit and collection. A mercantile establishment has relatively few customers with whom it must have correspondence on such matters, but the amount of money involved in each case is relatively high. The public utility, on the other hand, and specifically one that furnishes energy for light and power, must deal with an exceptionally high number of customers in the collection of accounts, but the amount of money involved in the average case is comparatively small. Another element of difference lies in the fact that the customers of a comparatively small business can be quite widely known to the people in the organization, while a large public utility can hardly hope for so enviable a situation.

When these essential factors are taken into account, as they must be in any consideration of correspondence, it becomes quite evident that the mercantile establishment can frequently write more personal letters than can the public utility. Yet, it is almost an axiom of modern correspondence procedure that every letter must be a personal utterance—must, in a word, be obviously a message sent by one human being to another, and not merely an assembly of dry phrasings that may have meaning but cannot have what is aptly called "punch" or "pull."

Advertising Value of a Good Letter

Every business, regardless of its nature, is keenly alive to the possibilities of modern advertising. Efforts to interest the great radio public are particularly noteworthy because there is a correspondence lesson to be drawn from the extensive use of the radio for advertising purposes. Those who constitute the radio audience number thousands, and, although it is possible for a speaker to arouse and hold the interest of hundreds, perhaps even thousands of listeners at one time, it is hardly conceivable that he can impress any listener with the fact that the speech is a personal utterance for him. This exemplifies the fact that words sent to the ear can hardly be made elements of personal utterance when the sender must speak to more than one person. The writer of a letter is not called upon to address an audience. He sends words to the eye of an individual, as it were, and whether the utterance is personal, or as general as a talk to an audience, will depend altogether on the way in which the writer performs.

An employee, in his personal contacts with the public, may usually be relied upon to represent his company fairly and to leave no misconception of its motives in the mind of a customer. In conversation, it is only natural for an employee to make sure that he is understood and to dispose of any request or complaint both graciously and effectively. But the writer of a letter lacks one of the advantages of the personal contact. He cannot know the reader's reaction to the typewritten page. More serious still, the tone and manner of expression will live in the reader's mind long after the message will have served its purpose and perhaps have been forgotten. Smiles and frowns are almost equally durable, and the one or the other is quite likely to be the legacy left by a letter.

wagon by the impact, one of them striking the wheel ere reaching the ground, causing fracture of the ribs and knocking him unconscious."

The wheel with broken ribs must have been an awful sight.

Have you a FEAR of that effective little punctuation mark called the PERIOD? If you have, get rid of the fear. A few periods will save you much woe. LONG SENTENCES, shot into the atmosphere without forethought, will drag almost any man into the mud. Long sentences frequently involve dangling modifiers, jangling cowbells that float around like lost souls, as they did in this case.

There is no grain good enough to run a race with a mouth. Whenever a foolhardy individual stages such a race, you can bet all you have on the mouth. It will outrun the brain every time.

Correspondence Bulletin No. 138

HOW "BREVITY" FAILS

"Installation of your service is held for a tree-trimming permit. As soon as we receive it, we will make the installation." That is substantially what was written in reply to a request for information.

Obviously, the outstanding characteristic of the quoted letter is brevity. There is nothing discourteous in either of the sentences. There is nothing radically wrong in the construction or in the choice of words. But does the letter tell an outsider anything satisfactory? He probably knows that two or three more or less mysterious wires must be run from an "electric pole" to his house, but do you suppose the average person can see any connection between service wires and trees?

WE know that trees must be trimmed if they stand in the way of electric wires. Yes; WE know it TOO WELL. We imagine that everybody else knows it.

A BRIEF letter to a customer HINTS much but TELLS practically nothing. When a customer receives a BRIEF letter about the necessity of a tree-trimming permit, who will give him the answers to the questions the letter puts into his mind:

Why is tree-trimming required?
Who issues a tree-trimming permit?
Who applies for the permit?
How long does it take to obtain it?

A CONCISE letter would not necessarily fill a page with words, but it would serve the customer by giving him the information he wants—not merely something to guess at.

Is the difference between BREVITY and CONCISENESS now clear?

Correspondence Bulletin No. 106

BLEACHED BONES

We wish to say.—WISH is a good word in fairy-tales. WISHING implies an almost hopeless longing for someing beyond reach. Say DESIRE if you must use some word of this kind. But why DESIRE to say something? Why not just SAY it? You need not DESIRE to thank somebody: just thank him.

Under date of.—What's the matter with ON? Would you say that you walked down the street UNDER DATE OF October 8? You might walk under a ladder, but not under a date. Letters are written and events occur ON certain dates, but not UNDER them.

Notify the writer.—THE WRITER is a wonderful term IF it is your intention to display all the FALSE MODESTY in your system. What is wrong with little ME? It won't bite you.

Your favor.—A letter is not a favor. We know that some letters are as far removed from favors as a sperm candle is from an incandescent lamp.

Inst. and Ult.—These two insects may have done well enough when Julius Cæsar lived—and spoke Latin. But many changes have taken place since Julius expired. We speak English now because that is the language OUR READERS UNDERSTAND.

This party.—It takes two to make a quarrel, and it takes two or more to make a PARTY (except in legal documents). An individual is a customer, a man, a woman, or a child or something equally as definite.

Stilted Phraseology

Whatever a letter says stands out in bold relief, either as a worthy advertisement of the company or as an indication that a friendly attitude toward customers is not its policy. And just as the writing of a letter must be left to an individual so, too, must interpretation of it rest on just one man or woman who is that most vital factor of all business—the customer. One of the earliest lessons to be learned by one who would improve his correspondence is that the language of business is neither the lofty phraseology of literature nor a collection of stale mouthings that have been appropriately termed "rubber stamps."

The old saying that "Virtue takes a middle course" is as applicable to letter writing as to any other of life's activities, and more so, if anything, because the business letter is effectually a substitute for a personal representative. As a representative knows that the language for a personal approach cannot take the form of oratorical bombast, resembling a Fourth-of-July oration in a small town, so he knows, too, that it must be sufficiently original to be natural if it is to be at all effective. The average letter writer could see this great truth if he would give the matter any thought, but he usually thinks that business has one form of language for oral utterance and something entirely different for what is to be written. The matter of first consideration, then, is to point out to the average dictator the fact that he should write effectually as he speaks.

Experience shows that the individual requires specific advice and that even common defects that are presented to all dictators through the medium of bulletins must occasionally be brought home to him in a personal appeal. But marked improvement in the correspondence of any particular department receives its greatest impetus from what we in the Commonwealth Edison Company sometimes refer to as "group consciousnes." This is nothing more or less than a growing realization, on the part of the several dictators in any unit of the organization, that the business letter is an important factor and merits concerted attention. The attainment of group consciousness in any part of the organization is almost inexpressibly satisfying because it marks the beginning of real cooperative effort to bring about what a correspondence advisor so consistently believes and so tirelessly preaches.

The "We Attitude"

One of the most serious diseases with which dictators are afflicted is commonly called the "WE attitude." In slang, this is tersely defined as the "BIG I." Dictators do not deliberately, or even consciously, indulge in an attitude that prompts them to consider only the company's side of any matter, but, nevertheless, they do indulge in this attitude until and unless they give enough thought to the subject of correspondence to appreciate the fact that a reader's interests and views are of paramount importance, and that what is appropriately called the "YOU attitude" is one worth cultivating.

When one understands that the WE attitude is not only an overuse of the pronouns WE and I, but a presentation of too many utterances indicating selfish consideration, he must see that condemnation of such an attitude is a business necessity as well as a point to be observed constantly in letter writing. As tone depends so greatly on attitude, it is fairly clear that an understanding of the WE attitude and a consistent avoidance of it is one of the major considerations in correspondence procedure.

Beginnings and Endings

Closely related to bad attitude, with all its corollaries, is the consideration of beginnings and endings. Many a letter is an ineffective and verbose composition merely because the writer does not know that the beginning is a strategic position, of which he should take advantage to say something effective in a concise way. The value of an effective ending cannot be stressed too greatly, because, as in practically every rule of action that can be applied to correspondence, we can take a simple lesson from life. When a dictator brings home to himself the realization that a personal representative, such as a salesman, must take proper leave of the person on whom he has called, he sees readily enough that his letter should end with some worthwhile utterance, and not be spoiled with some stale or ineffective phrase that can be called nothing better than "just words."

Little Error Bulletin No. 41

Error: "These meters are alright."
Correction: These meters are ALL RIGHT.

There is no such word as ALRIGHT. Usually the expression "all right" should be changed to "correct," or "accurate," or "proper." Ordinarily "all right" means very little, and it is used altogether too frequently.

BUT, when you do use this expression, be sure to write it correctly—ALL RIGHT.

Little Error Bulletin No. 53

Error: "He presented the case forcibly."
Correction: He presented the case FORCEFULLY.

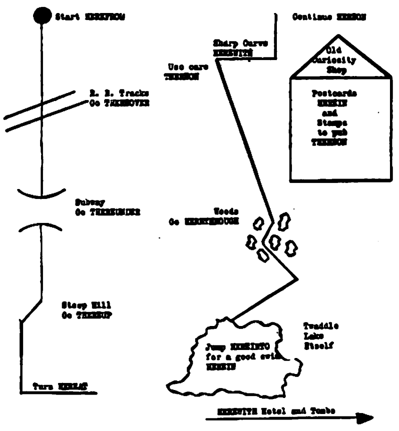
Although both words are based on the simple word FORCE, they differ materially in meaning. FORCIBLY usually implies physical action—force in a mechanical sense. FORCEFULLY means effectively or, for all practical purposes, convincingly.

The distinction between these two words should be noted. In nine cases out of ten, FORCEFULLY is the right word for the meaning intended. Many of us use its companion thoughtlessly and, therefore, erroneously.

Correspondence Bulletin No. 216

THE ROAD TO TWADDLEVILLE

This road map is for the guidance only of those whose fondness for the mummified twaddle of antiquity impels them always to hibernate mentally in the word tombs of the ages.



A Prime Factor in Customer Relations

The fundamentals that have been mentioned are the most important and most conspicuous of the highlights that correspondence study reveals. There are lesser points, too numerous to mention, that must be given prominence in the measures adopted by any advisory system. But whatever the method may be, it will give results that are worthwhile in any organization if it does nothing more than to create "group consciousness" that the business letter is a prime factor in customer relations and not merely an item of secondary importance in the daily grind of an industry's busy wheels.

EXTRA COPIES OF SERVICE SUGGESTIONS ARE AVAILABLE

To meet the growing demand for additional copies of Service Suggestions in loose leaf form the Customer Relations Committee has arranged to reproduce each issue. These may be ordered direct from the office of the chairman. The charge is five cents per copy.

An effort is being made to obtain a wider distribution of Service Suggestions so that the ideas and informaton which these monthly articles contain can reach the greatest number of individuals. The response to this effort and the letters from companies who have tried the plan proves the value of wider distribution.

Service Suggestion No. 70, "Employee and Consumer," contains specific information for employees of utility companies. Many companies have ordered copies for distribution to individual employees. Since the majority of employees are eager to improve themselves and their work specific information of this kind is very helpful in any campaign to improve service and build public good-will. Companies that have not taken advantage of this opportunity of procuring material for the information and guidance of employees have failed to take advantage of an excellent opportunity to improve the standing of their company in the minds of their customers.

H. T. East, *Chairman*, Customer Relations Committee,
1427 Edison Building, Chicago, Illinois.

INTERPRETATIONS of ELECTRICAL DEVELOPMENT

By Statistical Research Department, N.E.L.A.

H. A. SNOW, *Chairman, Statistics Committee, Accounting National Section*
H. S. BENNION, *Director of Engineering, N. E. L. A.*
WM. M. CARPENTER, *Research Statistician*
MERLE RAINEY, *Assistant Statistician*

The Statistical Research Department of the National Electric Light Association will issue monthly, in this section, basic statistical information on the electric light and power industry.

The Department regularly receives comprehensive annual and monthly reports from the larger member companies of the Association, whose total business represents 80 per cent of that of all electric light and power enterprises in the United States. In addition, the Department consults and cooperates with other sources of information.

Member companies are invited to make the fullest use of the statistical bulletins of this Department, published separately, as well as of the current statistical information in the N.E.L.A. BULLETIN, and to more fully utilize the services of the Department.

Current Statistics of the Electric Light and Power Industry

The data here presented are for the total (100 per cent) electric light and power industry and are based on monthly reports received from some 400 companies, representing over 80 per cent of the industry.

DURING MONTHS OF JANUARY AND FEBRUARY	JANUARY		Per Cent Increase	FEBRUARY		Per Cent Increase
	1929	1928		1929	1928	
*Kw-hr. generated	7,682,676,000	6,695,765,000	+14.8	6,960,730,000	6,334,094,000	+ 9.9
Add—energy imported from Canada and purchased from outside the Electric Light & Power Industry	178,518,000	232,878,000	−23.4	164,026,000	224,267,000	−26.9
Less—energy used in electric and other departments	245,000,000	242,000,000	+ 1.2	219,000,000	222,000,000	− 1.4
Total energy for distribution (kw-hr.)	7,616,194,000	6,686,643,000	+13.9	6,905,756,000	6,336,361,000	+ 9.0
Sales of energy in kw-hr. for:						
Farm service (not involving irrigation)**	6,395,000	....	....	6,183,000	....	....
Farm service (involving irrigation)**	17,840,000	....	....	21,011,000	....	....
Domestic service	1,015,518,000	906,574,000	+12.0	920,471,000	795,376,000	+15.7
Commercial service						
Small light and power	1,181,842,000	1,060,535,000	+11.4	1,110,906,000	999,227,000	+11.2
Large light and power	3,394,945,000	2,965,766,000	+14.5	3,401,355,000	3,004,441,000	+13.2
Railways and railroads (motive power)	543,800,000	506,730,000	+ 7.3	478,920,000	479,440,000	....
Other sales to ultimate consumers	210,089,000	188,038,000	+11.7	189,104,000	172,877,000	+ 9.4
Total sales to ultimate consumers (kw-hr.)	6,346,194,000	5,627,643,000	+12.7	6,100,756,000	5,451,361,000	+11.9
Total revenue	$186,330,000	$172,510,000	+ 8.0	$176,219,000	$163,440,000	+ 7.8
Revenue from sales for resales and miscellaneous (included above)	$9,678,000	$8,288,000	+16.7	$9,500,000	$8,930,000	+ 6.4
DURING THE TWELVE MONTHS ENDING	JANUARY 31			FEBRUARY 28		
*Kw-hr. generated	82,865,371,000	....	....	83,492,000,000	....	....
Add—imports from Canada and purchases from outside the Electric Light & Power Industry	2,321,705,000	(Comparable data will be available with the December 1929 report and at the end of each month thereafter)	....	2,261,000,000	(Comparable data will be available with the December 1929 report and at the end of each month thereafter)	....
Less—energy used in electric and other departments	2,632,000,000			2,629,000,000		
Total energy for distribution	82,555,076,000		....	83,124,000,000		....
New generating capacity installed (kw.)	1,890,000		....	1,890,000		....
Number of new customers added						
Farm customers	1,204,000		....	1,213,000		....
Domestic customers						
Commercial customers	252,000	....	....	252,000	....	....
Others	1,000	....	....	1,000	....	....
Total customers added	1,457,000	....	....	1,466,000	....	....
Important factors:						
Percentage of energy generated by waterpower	39.2	....	....	38.7	....	....
*Average pounds of coal per kw-hr. generated	1.71	....	....	1.71	....	....
Domestic service (residential use)						
Average annual consumption per customer (kw-hr.)	460	....	....	463	....	....
Average revenue per kw-hr	6.58	....	....	6.54	....	....

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*By courtesy of the U. S. Geological Survey with deductions for plants not considered electric light and power enterprises.

**As reported by 170 companies only.

Basic Information on the Electric Light and Power Industry

As of February 28, 1929

The data included in this table are basic factors of the electric light and power industry and will be brought up-to-date at the end of each month and published in each issue of the BULLETIN.

1.	Value of plant and equipment (estimated)	$10,100,000,000*
2.	Total generating capacity in kw.	27,625,000
	Steam	19,796,000
	Waterpower	7,533,000
	Internal combustion	296,000
3.	Total number of customers served	23,582,000
	Farm customers	195,000*
	Domestic customers	19,137,000
	Commercial customers	4,223,000
4.	Population in electrically lighted homes (Electrical World)	81,500,000
5.	Percentage of homes which are served with electricity	66
6.	Miles of transmission lines (11,000 volts and above) (1927) (circuit miles)	132,000

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*As reported by some 170 companies only.

The Cost of Living and Domestic Electricity

ALTHOUGH the cost of living today is two and a half times what it was in 1890, the price of household electricity is now but one-third of what it was at that time, according to the Statistical Research Department of the National Electric Light Association.

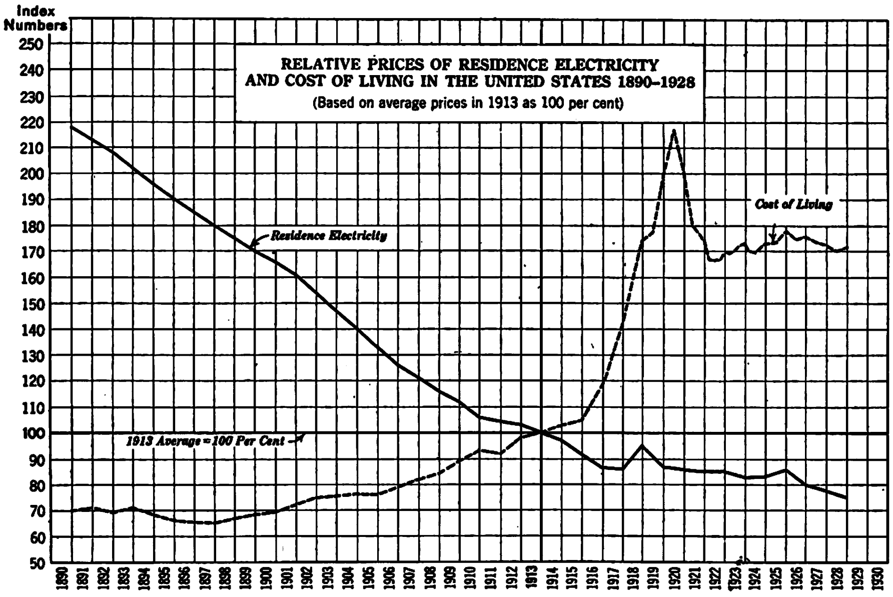
The average price of electricity for home use in the United States today is 25 per cent under pre-war prices, while the general cost of living remains at 70 per cent above pre-war costs. Each year since 1890 has seen a decrease in the average price of electric service in the home, with the exception of the years 1918 and 1925. In 1918, due to the shortened use forced by war-time lighting restrictions, the average price increased 10 per cent, which increase was wiped out in the two succeeding years. In 1925, there occurred a general rise in the cost of living, which was accompanied by a slight temporary increase of 1 per cent in the price of electricity.

The accompanying chart shows the relative trend of the residence electric rate and the cost of living since 1890; the year 1913 being taken as 100 per cent. The cost of living is that compiled and published by the United States Bureau of Labor. The average price of residence electricity between 1914 and 1925 is derived from statistics of companies in cities of 50,000 population and over, aggregating 60 per cent of the total urban population of the United States. Data for the years 1926 to 1928 are for the electric industry as a whole, as collected and published in the Statistical Bulletins of the National Electric Light Association.

In 1928, the average price for domestic electric current paid by the 19,000,000 householders of the nation was 6.6 cents per kilowatt-hour, according to the latest compilation of the Association. In 1913, the average cost was 8.7 cents per kilowatt-hour. The decrease of 2.1 cents per unit means a saving of at least $175,000,000 to the country's residence customers in 1928 under what their total charges would have been at the 1913 average rate.

Compared with 1919, frequently taken as exemplifying the first post-war year, the average price of electricity for home use now shows a decrease of 15 per cent. On the other hand, the average cost of living figure for 1928 showed a decrease of only 10 per cent below the average for 1919.

Roughly, electricity in the home is 1 per cent of the total family budget. This means that when the cost of living rises only 1 per cent, the amount of money represented thereby is approximately equivalent to the entire sum spent in the United States for residence electricity. The constant decreases in home electricity in this country well exemplify the principle of lowered cost with increased use and greater diffusion of service.



New Lighting Institute

(Continued from page 290)

special exhibit section devoted to transportation and aviation. The latter is equipped with a large model of the latest approved design of aviation field with landing lights automatically controlled by the sound of a miniature aeroplane flying overhead.

Across a passageway the visitor then discovers the office of the Director of the Institute, a model of up-to-date appointment and illumination; and next in line the conference room and general offices of the Lighting Institute. In one corner is located the work shop, fully equipped with wood working machinery, tools, and materials of all kinds for the repair and maintenance of the many exhibits. Also in this shop will be constructed the alterations to various exhibits from time to time as well as special exhibit pieces to be sent out for special showings in various parts of the country.

Ralph Neumuller has been appointed Managing Director of the Westinghouse Lighting Institute. As former merchandising and advertising manager of the United Electric Light and Power Company, he brings to the Lighting Institute a wealth of practical knowledge concerning the problems of the lighting industry and a wide acquaintance among central station executives and other electrical men throughout the country. He is assisted in his work by a staff of competent men and women who have spent years in engineering development and promotion activity of the Mazda lamp business.

ENGINEERING SECTION

E. C. Stone, *Chairman* H. S. Bennion, *Director of Engineering, N. E. L. A.*

Electrical Apparatus Committee Meeting

By T. G. LeClair

The Electrical Apparatus Committee met at Memphis, Tenn., March 13 and 14 with J. Allen Johnson, Chairman, presiding. There were three half day general sessions in addition to a half day devoted to subcommittee meetings and inspection trips. The following summary indicates the nature of the topics discussed:

Codes and Standards

The A. I. E. E. Standards Committee is proposing to undertake the formulation of Test Codes for electrical apparatus. The apparatus Committee, in general, feels that in order to make the present A. I. E. E. standards easily applicable, it would be desirable to have a test code which would indicate the manner in which prescribed tests shall be obtained. A standard method of testing similar to those used by the manufacturers would be very desirable.

Utilization

The Utilization Subcommittee with L. B. Bonnett as Chairman reported that results of a questionnaire have been received from various Geographic Divisions as to the desirability of changing the standard utilization voltage. The reports from these divisions indicate that the standard 110-volt utilization voltage is practically obsolete. Only 5 per cent of the companies reporting wished to retain the 110-volt standard and these were smaller companies. A proposal to drop the 110 volts as a standard system voltage at the end of one year was agreed to by a majority of those present and at a later meeting the question of whether or not to make 120 volts a co-equal standard with 115 volts is to be considered. The N. E. L. A.-N. E. M. A. Joint Committee on Preferred Voltage Ratings is asked to consider the correct rating for appliances to be used on the proposed standard system voltages. As a basis for this study, a recommendation was also made that a careful analysis be undertaken of the actual voltage at the utilization device.

Considerable progress is being made toward the increased use of approved motors with low starting current for household appliances. A number of washing machine manufacturers are now using the approved motors and many others are rapidly changing to the new type. L. L. Elden, who has been in charge of this subject, reports that manufacturers of the new "Exerciser" machines are very willing to use approved motors for these devices as soon as the trouble is pointed out to them.

Non-Resonating Transformer

F. W. Peek of the General Electric Company gave a brief discussion of the effect of lightning on transformers. He followed this by an illustrated description of a transformer designed to distribute over-voltages uniformly through the transformer coil. The design principle of this non-resonating transformer is a shield between central points on the winding and the high tension end of this winding. The capacitance of these shields corresponds with the capacitance between the same points and the transformer neutral. By means of their use, the distribution of the surge voltage is made the same as the distribution of the steady voltage and as a result the transformer insulation is uniformly overstressed.

Interconnections and Contracts

The Operating Practice Subcommittee (P. B. Juhnke, Chairman) presented a symposium on the operating aspects of interconnections and interchange energy contracts. An outline was presented covering load and frequency control, stability, protection, metering, communication, and coordination of interconnections. This outline is devoted primarily to the operating aspects and, as such, does not conflict with the work performed by the Fundamental Plan of Systems Subcommittee. A description was offered of the various types of contracts which are now in effect, together with some of the advantages and disadvantages of these contracts. Different contracts are required depending upon the type of interconnection, which may vary from the simple border line connection which is used for reserve supply to a substation or load center, ranging up to very closely connected networks and interconnections which are used for firm power. In reply to questions asked of many companies, the opinion was brought out that the demand clause should be left out of practically all contracts in order to simplify the operation of interconnections. Some of the most successful interconnections are operated without any contract whatsoever, and payments for energy interchanged are arranged on oral agreement from time to time.

A series of measurements were made on a 250-mile transmission loop to determine the phase shift with the loop opened at one point. Under some conditions, the phase difference across the open circuit breaker ran as high as 14 degrees. By closing the breaker after making measurements, the circulating current through this loop was found to be about 900 kw. per degree of phase displacement. Two methods of controlling this phase angle to prevent circulation of current in the loop are the use of 3-phase regulators or the use of tap changing transformers with the tap voltage 90 degrees out of phase with the line voltage. A third method suggested was the use of series capacitors in one or more lines of a loop which have an effect equivalent to changing the line impedance by balancing out the reactance. On another system with a 1400-mile loop, the phase shift across the open breaker was 50 degrees and the energy interchange with closed loop amounted to about 100 kw. per degree.

W. M. Dann of the Westinghouse Company gave an illustrated description of the principal features in the static transformer type of phase shifter. This type of phase shifter is practically the same as an ordinary tap changing transformer except that the primary connections are rearranged to insert voltage 90 degrees out of phase with the line voltage. The amount of compensation necessary to obtain a 20 degree shift on the line voltage is 36 per cent of the line voltage. None of these phase shifting devices has been put in service but they make a very satisfactory method of correction when it is not desirable to increase the transmission line capacity in certain parts of the loop to prevent overloading.

For systems covering a considerable territory, the indications are that for a reasonable degree of concentration in generating capacity, the addition of interconnected overhead lines does not add materially to the duty on circuit breakers. The line impedance for lines 10 miles or more in length at 33 Kv. or 50 miles or more in length at 110 Kv. is sufficient to cause no appreciable increase in the short circuit current due to what comes in over these lines.

Circuit Breakers

The Substations Subcommittee (L. G. Smith, Chairman) presented a symposium of statements by representatives of circuit breaker manufacturers on developments in ironclad switchgear and non-oil-throwing circuit breakers. One manufacturer is attempting to obtain the non-oil-throwing feature in circuit breakers partially by increasing the number of series breaks which should reduce the extent of decomposition in the oil by absorbing the heat of the arc in more and heavier electrodes. Two manufacturers have developed new lines of round tank, 3-pole circuit breakers for tank diameters from 16 to 32 inches. This new line is offered as a considerable improvement on circuit breakers of the lower interrupting capacities. For breakers of the higher interrupting capacities, the economy of the single tank is not apparent. One company is experimenting with breakers of the percussion type which interrupt the circuit by blowing oil or some inert gas through the arc stream. Further research is also being conducted on the vacuum type circuit breaker and the indications are that with a metal container to obtain the necessary mechanical strength there is possibility for commercial development on this type breaker. One railroad has applied 50 high speed oil circuit breakers which have an average time of operation from the application of the short circuit until the breaking of the arc, averaging about 0.6 cycles on a 25-cycle system. The manufacturer reported these breakers to be giving satisfactory service.

Many different types of metal-enclosed switchgears have been offered, including simply a metal housing around the circuit breaker and conducting parts, also, grease-filled, gum-filled, dry compound-filled, and oil-filled compartments. All of these types appear to promise satisfactory service for certain applications.

Two of the manufacturers have agreed to use their oils interchangeably in circuit breakers.

General

A number of inspection trips were made by members of the committee, including power plants, substations, and the A. C. network system.

The committee wishes to thank the Memphis Power & Light Company and the people of Memphis for their hospitality during the sessions.

Overhead Systems Committee Meeting

By HAROLD COLE, *Chairman*

THE Memphis meeting of the Overhead Systems Committee was held March 11 and 12 at the Peabody Hotel. While the number of members-at-large present was not as great as at some previous meetings, the number of visitors brought the attendance up to about one hundred at some of the sessions.

Reports of Committees

Two subcommittees presented serial reports at this meeting. These were the Steel Tower Transmission Lines Subcommitttee, L. O. Waite, Chairman, and the Construction and Maintenance Equipment and Methods Subcommittee, Philip Stewart, Chairman. These reports will be reviewed again by the Executive Committee of the Overhead Systems Committee and will then be submitted for publication.

Progress reports were made by the other subcommittees of which the following are of principal interest:

The matter of marking and lighting transmission lines and towers is progressing satisfactorily. Aviation authorities seem to be of the opinion that nearly all commercial flying will be at higher altitudes and the probabilities are that the illumination of overhead structures near airports will be the only thing which will be required.

The collecting of information on wind and ice loading is proceeding quite satisfactorily through the active cooperation of geographic committees and the weather bureau, and valuable data are being obtained.

The demand for up-to-date specifications for wood poles is such that the committee will endeavor to publish suggested specifications without waiting for the American Standards Committee Subcommittee which does not seem to be making any progress.

Wood Preservation

Mr. Charles Kerr, Field Engineer of the American Wood Preservers Association gave an illustrated talk on the preparation and manufacture of pine poles which is summarized as follows:

> The purpose of preserving timber is to prevent the destructive action of decay and insects, and thus prolong the useful life of a structure.
>
> The object of the timber treating industry is to give to the construction engineer a material that will effectively serve the purpose for which it is intended, at an economical cost, and we believe that this end will be best accomplished in those cases where pine poles are used, by a close adherence to the most general use of pressure treated timber, preserved in accordance with the standards of the American Wood Preservers Association.
>
> The action of germs of decay on timber is similar to the attack of insects. To exist, decay germs must have air, temperature, moisture and food. The elimination of any one of these necessities of existence will discourage the formation and growth of decay.
>
> Air, moisture and temperature may be regulated or excluded only with great difficulty, but the destroying of the food value of the timber is relatively an easy task, provided proper and proven preservatives are used. The proper application of an effective preservative to the timber will destroy this food value, and thereby prolong the life of the timber indefinitely.
>
> By proper application is meant the injection of the preservative into pine timber, under pressure. A dependable preservative must be possessed of at least four virtues to be effective. It must possess sufficient toxicity to discourage and prevent the *initial* attack of decay or insects; it must be available on the open market in large quantities; it must be inexpensive; and it must possess permanent qualities.
>
> The American Wood Preservers Association believes and recommends that pine poles and crossarms should be pressure treated full length with coal-tar cresote to give the maximum of protection at a minimum of cost, with a minimum retention of 8 pounds of preservative to the cubic foot of timber, dependent upon the service desired from the pole. All pine poles and crossarms should be framed to specifications before treatment, and framing after treatment should be avoided whenever possible. Should it be necessary to do framing in the field, all cuts in the wood should be protected by a free application of hot coal-tar creosote.

Numerous views of treating plant operating, pole line installation, and views of old creosoted timber structures were shown and explained.

Service Restoration

A group of papers on "Service Restoration" which had been prepared at the request of the Subcommittee on Operating Procedure, Mr. C. S. Van Antwerp, Chairman, was presented by the representatives of the various companies reporting.

These papers described the organization which had been set up to handle "trouble calls" in each case and the general procedure followed and brought out some interesting differences in procedure.

The companies reporting and the author of the papers were as follows:

The Philadelphia Electric Company—C. D. Buchholz.
The Edison Electric Illuminating Company of Boston—P. T. Butterworth.
Potomac Electric Power Company, Washington, D. C.—D. H. Lockwood.
Puget Sound Power and Light Co., Seattle, Wash.—M. T. Crawford.
Public Service Company of Northern Illinois —F. E. Andrews.
Commonwealth Edison Company, Chicago—K. E. Hobart.
Queens Borough Gas and Electric Co., Far Rockaway, N. Y.—H. Oberle.
Public Service Electric and Gas Co., Newark, N. J.—J. S. Ware.
Central Hudson Gas and Electric Company, Poughkeepsie, N. Y.—O. H. Bundy.

A report will be prepared by the Operating Procedure Subcommittee which will summarize the contents of these papers and similar information for other companies.

Railroad Wire Crossings

Mr. J. C. Martin, Chairman of the Railroad Crossing Subcommittee reported that his committee was now working with a committee of the American Railways Association in the preparation of principles and practices for the crossing of power wires and railroads. No definite progress could be reported but both parties had prepared proposed drafts which indicated that there was no serious disagreement. A meeting was scheduled for March 21 at which the committees of the two organizations would get together for the first time.

Objectionable Advertising

Mr. T. H. Haines called attention to a recent advertisement which appeared in the January number of the *Review of Reviews* and which was evidently paid for by the Union Metal Manufacturing Company. This advertisement appeared in the form of an article among the other articles in the magazine, the only thing that indicated that there was any difference being the word "advertisement" in small print at the bottom of each page. The advertisement appeared to be propaganda intended to influence public opinion and especially municipal authorities to force power companies to replace wood poles with steel poles. The text of the article contains some very misleading statements and gives false impressions which are still more misleading. The reader is led to believe that the average life of wood poles is about seven years. He also gets the impression that these poles have been used for general distribution purposes in many of the larger cities, whereas they have been used in these cities only for ornamental street lights supplied from underground circuits. The first part of the article is filled with eulogy of the power companies which is evidently intended to ease the mind of power company executives.

The opinion was strongly expressed by various committee members that this type of advertising was very objectionable and that member companies should take every occasion that might arise to manifest their disapproval of this kind of advertising.

Transmission Line Construction

Mr. E. A. Turner of the Appalachian Electric Power Company of Roanoke, Virginia, gave a very interesting talk, illustrated with 120 slides, on the building of a 180 mile, 132,000 volt transmission line through the Appalachian Mountains. The slides showed pictures of the territory through which the line was to be built, the line under construction, and finished portions of the line. This line traverses a very rough country and follows the mountain ridges. Spans are from peak to peak and are from 500 ft. to 4000 ft. in length. Steel towers are generally placed on mountain points many of which were so sharp that it was necessary to blow off the peak in order to get a flat space large enough to place a tower. The earth at most locations is rock. Forty tons of dynamite were used in the construction of this line. Most of the tower locations were nearly inaccessible. No roads were available and it was very difficult to get material to and from the job. When construction was started, tractors were used for conveying material. These were abandoned in favor of horses and mules with wagons. These were later abandoned in favor of oxen.

The oxen are more sure-footed and on the long hauls are actually faster than the horses and mules. In hauling some loads it was necessary to have forty yoke of oxen on one load for the following reason. The forty yoke are strung out over a length of about 600 ft.; a large number of the oxen would always have comparatively good footing; others would be going over rough, slippery places. Sometimes, six or seven yoke of oxen would fall down and would tend to slide down the hill. It would be necessary to have enough yoke of oxen to hold the slipping oxen and the load, thus it was forty yoke were required in many places. The conditions, difficulties and methods were so new and unusual to most of the members of the Overhead Systems Committee that no adequate idea of those could be conveyed except by pictures. The pictures were good and were very instructive.

Mr. L. E. Utley of the L. E. Meyers Company, Chicago, Illinois, gave a very interesting talk, illustrated with many slides, on the construction of a 132 kv. transmission line from Cincinnati to Indianapolis. This line is 85 miles long and 25 miles of it runs through very bad country. Most of the material was transported by tractors. Digging was done with digging machines and refilling with machinery. Considerable erection was done by machinery. Horses were used in the hills. Caterpillar tractors were generally used, since it was possible to get to most locations with this kind of a machine.

Most of the ideas were conveyed by means of pictures which Mr. Utley described and which showed very clearly difficulties experienced in building this line.

Mr. A. E. Davison of the Hydro Electric Power Commission of Ontario gave the Committee an idea of the problems encountered in the construction of a 220 kv. line in eastern Ontario by means of motion pictures. Mr. C. F. Benham of the Great Western Power Company also described a type of transmission tower developed by his company for single circuit 220 kv. construction which is particularly applicable where a great deal of side hill construction is necessary.

The Effect of Lightning on Transmission Lines

Mr. F. W. Peek, Jr., of the General Electric Company, gave the Committee and a number of visitors from other committees a very instructive talk in which he described the latest results of the extensive research being carried on by his company in the matter of the effect of lightning on various parts of a transmission system and methods of protection against breakdowns of equipment. During the past year considerable progress has been made in the study of lightning, due to the use of the cathode ray oscillograph and the development of a means of connecting it to a line at the time the lightning surge occurs. Actual photographs of surges have been obtained and the wave shape determined and apparatus set up to reproduce the surges in the laboratory and on actual lines to further study the effects. One of the results of the studies of the effects of surges has been the development of the non-resonating transformer which is designed to keep surge voltages from building up in transformer windings.

Mr. Peek showed a number of slides to illustrate his talk and among these were many interesting oscillograms. Inasmuch as papers are available which cover the subject of Mr. Peek's talk no attempt will be made to summarize it here. A pamphlet has been published by the General Electric Co. entitled "Lightning—Progress in Lightning Research in the Field and in the Laboratory" which is obtainable upon request.

Prime Movers Committee Meeting

By Edwin B. Ricketts, *Chairman*

The Prime Movers Committee joined the other committees of the Engineering National Section in a group meeting in Memphis, Tenn., on March 11 and 12, with an attendance of thirty-nine members and six guests.

This was the final meeting of the year and therefore the appointed time to receive final reports from the major subcommittees.

Higher Steam Pressures and Temperatures

A very complete report was submitted by Mr. McDonald on the subject of Higher Steam Pressures and Temperatures, in which rather complete and detailed statements are contained from ten plants operating with pressures in excess of 450 lb. Six of these plants are, or will shortly be, operating at 1200 to 1400 lb. and four with pressures between 600 and 700 lb. These statements contain data on operating troubles and very frankly set forth experiences with these relatively new pressures and temperatures.

Statements covering recent research in steam conditions and characteristics for these higher pressures and also for stresses under high temperatures are contained in this report.

Caustic Embrittlement

The subject of caustic embrittlement and its prevention at high pressures and temperatures is covered in a report by Professor Straub, containing the most recent information on experimental determination of safe operating conditions.

Pulverized Fuel

The Pulverized Fuel subcommittee reported an increase in the use of unit type of pulverized fuel installations for both industrial and public utility plants. Its report also covers the question of collectors for dust from mill and cyclone vents. One operating company is using a bag filter with very satisfactory results.

There seems to be a tendency to use horizontal turbulent type of burners and to arrange the furnaces for removal of ash in molten form in the so-called slag tap type of furnace.

Operating troubles with slag on the boiler tubes and mill maintenance costs, etc., are covered in considerable detail in the report.

Stokers

The Stoker Subcommittee report outlines a new development in the Taylor stoker wherein a new method of driving the rams has been devised to decrease the wear and maintenance costs. Likewise, the new Westinghouse stoker containing a considerable overfeed section following the underfeed retorts, is described both by the manufacturer and by the Brooklyn Edison Company which has such a stoker installed in its new addition to Hudson Avenue Plant.

The ever-present discussion between various types of furnace water cooled walls is covered by statements from manufacturers and operating companies, although no quantitative data are available to prove the superiority of one over the other.

Turbines

The Turbine Subcommittee has again collected data covering the operating records of turbines over 20,000 kw. and this year's report will bring these records up to date and show a very complete history of experience with these large machines. It is interesting to note that the first year's operation of new machines shows no better results than for machines of three or four years ago.

The report will show the experience record of 153 machines installed in 1926, 186 machines installed in 1927 and 200 machines installed in 1928. The service demand factor on turbines was slightly better in 1928 than 1925—72 and 68 per cent respectively. Likewise the availability per cent was 96 in 1928 and 94.6 per cent in 1925.

The results of numerous tests on turbines is included in this year's report, showing both the water rate and the B.t.u. consumption.

Automatic Frequency Regulators

Several companies reported on the use of automatic frequency regulators, most of them so far reporting that the regulator produced a remarkably constant frequency but at the expense of irregular load on the turbine and undesirable fluctuations in the steam pressure and bleeding conditions. The Commonwealth Edison Company reported a modification of the Warren system in which these difficulties had been eliminated and very satisfactory results are being obtained.

Boilers, Superheaters and Economizers

The Boilers, Superheaters and Economizers Subcommittee submitted a very complete report covering the development of steam generating equipment with particular reference to high pressures and temperatures which is the trend in design at the present time. The report calls attention to the relatively large benefit that would result by the increase of superheated steam temperatures from the customarily accepted limit of 750 deg. to 900 or 1000 deg., if and when such is feasible, by the use of metals capable of withstanding the required stresses at these high temperatures. The report also contains a statement from an oil refining company on the operation of high pressure cracking stills in which pressures and temperatures considerably above boiler room practice are in common use.

Oil Engines

The Oil Engine Subcommittee submitted operating cost data for the year 1928 and were instructed to combine this data into a yearly basis and submit it to the Editing Committee for publication.

Round Table Discussion

Under the heading of "Round Table Discussion," Mr. Baltzly described a washing machine for continuous use on a turbine, in which a certain amount of lubricating oil is by-passed continuously, mixed with water at 160 to 180 deg. fahr., and passed through a Delaval separator and thence back into the system. The use of this machine has made it unnecessary to clean the oil pipes or the oil cooler for over two years and thereby has materially reduced the maintenance cost and trouble usually encountered from the accumulation of sludge and dirt in the oil passages.

Professor Christie told the Committee of the practice in Europe of comparing station performance from period to period by plotting a total station B.t.u. versus total kwh. output. This results in a Willans line and is used in England and on the Continent for control purposes. He had plotted some data from one American station on this basis and found somewhat inconsistent results because of changed conditions due to improved design with each additional unit of construction. He asked for data from other stations in order that he might plot this data and compare it with practice in Europe.

The Committee learned with deep regret of the death on March 2 of John Wolff who had long been a member of the Prime Movers Committee. The Committee, through its Secretary, expressed its sympathy to Mr. Wolff's relatives and to his Company officials.

The next meeting of the Committee is scheduled for October, 1929, at time and place to be announced.

Underground Systems Committee Activities

By J. W. SYLVESTER, *Chairman*

THE Mid-Winter meeting of the Underground Systems Committee, Engineering National Section, N. E. L. A., was held at Pittsburgh on Jan. 24 and 25, 1929, while the Spring Meeting of the Committee,, as a part of the Engineering National Section Group Meeting, was held at Memphis on March 13 and 14, 1929. Both of these meetings were exceedingly well attended.

The programs which had been prepared in advance were closely adhered to. Many Sub-committee reports were distributed to members requesting advance copies. This practice has resulted in quite lively discussion which would probably not have been possible otherwise. The following Sub-committee reports were presented:

Cable Installation

A. F. Randolph, Chairman, rendered a progress report dealing with the installation of long cable sections, aerial cable, buried cable, the protecting of cable risers, an outline of an economic underground distribution system and an insulated pothead support. The economic feature of the secondary distribution system described was accomplished by the use of rubber insulated, unleaded cable on open wiring in the manholes with the same type of secondary service cables, both single and multiple conductor. Successful installations of cable sections approximating 1000 feet in length were described.

A. C. Networks

H. S. Davis, Chairman, reported a compilation of answers to a questionnaire covering the operating practices and experiences of the companies which have installed A. C. networks within the past few years. From the operating experiences of the companies replying to the questionnaire, little difficulty has been experienced in burning off faults on secondary systems where the mains were tied in solidly.

Cable Joint Design and Construction

R. G. Hooke, Chairman, and C. W. Franklin presented a report, in which was given among other points, trends of development pertaining to high voltage joints, as follows:

1. A decided preference for varnished cambric tape.
2. Plastic compounds above 20,000 volts.
3. Electrostatic shielding.
4. Stepping of insulation instead of pencilling.

A. E. I. C. and N. E. L. A. Joint Sub-Committee on Analyses of Cable Failures

F. M. Farmer, Chairman, and H. S. Davis recommended a simplified form of report for the N. E. L. A. use which was adopted. We are leaving the more definite detailed data to be secured through A. E. I. C. channels from the fourteen largest operating companies.

Impregnated Paper Insulated Cable Research

D. W. Roper's report was presented by Herman Halperin. It gave an outline of the researches which are being sponsored by the Sub-committee, as well as those which are being conducted by the members companies, by the manufacturers and by the Electrical Testing Laboratories. The report showed that there was still a great deal to be learned regarding the effects of entrained moisture, occluded air, nature of compound, use of special gases as inhibitives to ionization, evacuating and impregnating processes nature of paper, etc. The report closed with a statement of the experimental studies which have been carried on by the Electrical Testing Laboratories on the effect of end conditions; the treatment of samples on the results of dielectric loss tests; the stability of compounds and many other factors entering into cable design and operation.

Inspection and Testing of Cables

The annual report of this Sub-committee was presented by Mr. Randolph. It indicated in general a continued trend in the direction of improvement with decrease percentages to deficiency and insulation resistance, power factor and ionization factor distinctly improving. The relation of these topics to researching progress is also discussed.

Conference of Company Code Representatives in Chicago

THE discussions which arose in connection with the grounding rules of the National Electrical Code during the past year aroused among member companies more interest in code questions than had existed for many years before. This discussion also had the effect of impressing the entire membership with the actual interest which power supply companies have in all of the electrical codes. There has always been a relatively small group of central station executives and engineers who have appreciated the importance of the codes, and who have participated actively in their development, but in spite of the very large amount of devoted voluntary work contributed by these men, it has still remained extremely desirable to procure the general participation of all member companies, since correct estimates of varying local conditions are essential for the formulation of sound policies in connection with code developments.

The developments of the past year have shown in a striking manner the extent to which code development has depended upon opinion and estimate; it has been plainly shown that important groups of rules have been developed in this way. It is possible that the situations to be dealt with were originally urgent enough to compel this process; but unfortunately little has been done since to re-examine the earlier premises with the result that many rules, having important economic effects, rest upon slender foundations of recorded fact.

These two considerations led the National Electric Light Association during the winter of 1928-1929 to enlist the services of a corp of company code representatives. These company code representatives directly represent member companies in codes and standards activities, primarily for the purpose of reporting the needs of the companies in this field, but also for the hardly less important function of collecting and reporting data upon matters affecting code rules. For administrative purposes they are considered to be agents of the Codes and Standards Committee.

Consideration of the elaborate committee structure of the Association might lead one at first to regard the formation of this body of company code representatives as an unnecessary duplication, but this is not so for the following reasons: The committees of the Association have adequate jurisdiction and are capable of formulating policies in the codes and standards field, and they are also well adapted for the deliberate consideration of the technical and commercial questions involved. Committees, however, are necessarily limited in membership to representative men in their particular specialties and their coverage is, therefore, not adequate for a rapid reflection of opinion throughout the membership. Moreover, the ordinary mode of committee procedure is generally unsuitable for the prompt collection of data in a form that fully reflects local variations and peculiarities. Both of these factors, especially the element of time in each, are essential for the administration of code activities.

The company code representatives do not constitute a committee. It is highly improbable that they will ever be brought together for the purpose of stating the Association opinion upon technical, commercial, or administrative matters, within their field, principally for the reason that there are existing committees quite competent for this purpose. The individual opinions of company code representatives, or rather the opinions which they will express on behalf of their companies, will be frequently sought, and normally the collection of information so procured will be submitted to the appropriate committees of the Association for a deliberate conclusion and statement of Association policy. In a similar manner, the large amounts of data and statistical information supplied by company code representatives will be arranged in workable form and submitted to the appropriate committees of the Association for consideration.

The outstanding fact revealed by the year's activities has been the lack of reliable information on questions which determine the need for various code requirements. This, therefore, is the first duty that company code representatives are called upon to perform; indeed, they have already contributed extensively in this respect. On account of recent activities in the field of the National Electrical Code, special attention is being devoted at this time to questions related to the low voltage electrical hazard, in order that a correct estimate may be made of the prevalence and the characteristics of this hazard. This is not the only function of these representatives, however; they are also expected to compile reliable experience records upon various other hazards dealt with in the electrical codes, and it is hoped that within a comparatively short time the Association will be in a position to state the results of field experience for various classes of hazards with considerable precision.

A conference of these newly appointed company code representatives was called in Chicago on March 18 and 19, 1929. The purpose of the conference was to discuss with them the needs of the Association in the code field, and to instruct them in their duties. The conference was very well attended, seventy men from all parts of the country were present. The first session of the conference was devoted to addresses by prominent authorities in this field. Mr. E. W. Lloyd, vice-president of the Commonwealth Edison Company, presided, and addresses were delivered by Judge O. B. Ryon, General Counsel of the National Board of Fire Underwriters, M. E. Sampsell and E. C. Stone, chairmen respectively of the Commercial and Engineering National Sections, Irvin W. Day, chairman of the Codes and Standards Committee, and Alva R. Small, vice-president of the Underwriters' Laboratories and chairman of the Electrical Committee NFPA. It is planned to publish these addresses in subsequent numbers of the BULLETIN.

The remaining sessions consisted of general discussion of the services which company code representatives are asked to render, the service which they may expect from the Association, and the best means for doing these things. The conference also discussed the various electrical codes, their characteristics and trends of development, desirable changes in their form and substance, and other matters intended to give the representatives a general view of the situation and of their relation to it.

The interest displayed by the members of the conference was extremely satisfactory and it explained as well what has for years been taken as a lack of interest in code matters. It was apparent that there is a healthy and intelligent interest in code questions among member companies and that the difficulty of apparent indifference has been due mainly to the absence of definite channels for giving and receiving information and for guiding isolated activities in a way to procure coordinated action. This is what the company code representatives are expected to accomplish.

Great Lakes Engineers Meeting

ABOUT two hundred engineers gathered in Chicago, April 18 to 20, for the first 1929 meeting of the Engineering Section, Great Lakes Division, N. E. L. A.

All of the sessions were well attended, but those of the overhead systems and underground systems committees appeared to be most popular. A notable contribution to the work of the former committee was the report on reliability of transmission lines of more than 100 kv. This report tabulated line outages according to their significant classifications and should be a valuable index of performance in determinations of design. Another matter that excited much interest and discussion was a comparison between manual and machine costs in pole-line erection.

The underground systems committee was mostly occupied with problems of duct-line and manhole construction and with means to assure perfection in making cable joints. The experience of the Detroit Edison Company with shielded cable and its solution of the distribution of electrostatic stresses in joints on this cable excited interest. An excellent series of still and motion pictures of labor-saving and cost-cutting machinery used in its underground construction was presented by the Commonwealth Edison Company.

Meter schools and other educative activities were live topics with the meter committee, as was also that perennial subject of discussion—outdoor meters. The electrical apparatus committee considered the progress so far made on the assembly of a map showing transmission lines in the Great Lakes region, the purpose being to provide an easy source of reference when interconnections between systems are in consideration. The hydraulic power committee discussed the project, originating in the national body, for the appropriation of a sum of money for the development of test methods on hydro-plant performances. A large part of the time of all committees was devoted to acquainting the local members with the work of the National Committee.

Investigation of Faults on Power Lines as They Affect Telephone Lines

ONE of the most noticeable developments in the central station industry during the past decade has been the concentration of large blocks of power at the generating station and load centers and the inter-connection of these centers by high voltage transmission lines. With the increasing importance of these arteries of power and the increasing importance of the reliability of service, attention has been directed toward schemes of relay protection which would limit the amount and extent of the system disturbance at times of insulation failure. This has led to studies of system stability, methods of relaying and methods of calculating the magnitude of fault current. The same developments in the industry which have brought these operating problems have brought closely related problems in the field of inductive coordination.

Inductive coordination of power lines with telephone lines includes two broad classifications: The first of these is the noise resulting from induced voltages within the voice frequency range which may exist under normal operating conditions and is frequently referred to as voice frequency or "normal" induction. The second of these is the voltage at fundamental frequency induced on the telephone lines at time of ground faults or other unbalances to ground on the parallel power system which may be of such magnitudes as to cause serious disturbances to the telephone plant. This latter type of induction is spoken of as low frequency or "abnormal" to distinguish it from that which produces noise under normal operating conditions.

An article in the February issue of the N. E. L. A. BULLETIN told of the work that Project Number 2* is doing to solve the problem of limiting the effects of voltages that may be induced in telephone circuits from paralleling power circuits. Project Number 3* has been working on another phase of this problem. Its efforts are being directed in part at finding means for limiting the voltages that might be induced from a given parallel and at limiting the currents in the power system under ground fault conditions. So far in its work it has obtained information on the following points:

(1) Method of calculating fault current on a power system at time of single-phase-to-ground failure. This includes both formula to be used in such calculations and knowledge of the range of constant to be used with them.

(2) Division of fault current between earth and other paths, including effects of ground wires and shield wires.

(3) Methods of limiting fault current. The effectiveness of these measures and the limits in their use imposed by operating conditions on the power system.

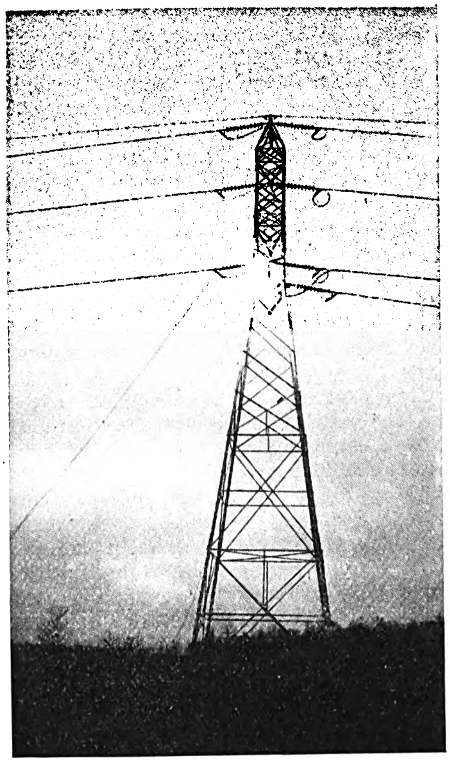
(4) Effects of shield wires on telephone lines and effects of cable sheath grounding.

This committee conducted a series of tests in Dayton, Ohio, and working with Project Committee Number 2 secured some valuable information at Athenia, New Jersey. In addition it has entered into several other cooperative studies.

The tests in Dayton were conducted on the 33 kv. system of the Dayton Power and Light Company. They consisted of oscillograph measurements of currents and voltages when single-phase-to-ground faults were applied to the lines. The tests were made under system operating conditions. The data which was secured may be listed under the following headings:

(1) Information which serves as an excellent check on the method of calculating the single-phase-to-ground short circuits by the symmetrical component method developed by C. L. Fortescue and others. This theory was further enlarged to include the effect of loads and line capacitance. The significance of these further refinements on the accuracy of calculations has been considered.

(2) The use of a resistance in the neutral of power transformers at the generating station was studied to determine the effect of changing the value of resistance on: the magnitude of single-phase-to-ground fault current; the distortion of the voltage triangle at time of single-phase-to-ground fault; the power available for relaying; and the voltage surges resulting from switching operation and arcs across insulators.



An intentional arc across an insulator. Part of a study on 132 Kv. line.

One of the interesting facts brought out by these tests was that a transmission circuit operating as a closed loop may have sufficient uniphase current induced into it from a single-phase-to-ground fault on a paralleling feeder to operate its ground current relays. This phenomenon may account for cases of faulty operation where sound lines have been tripped out by residual relays at the time of a single-phase-to-ground fault on a paralleling feeder. It should be pointed out that this same condition may occur on a line protected by ground current relays where the transformer connections at both ends are grounded wye-delta. The reason for this is that a low impedance path to ground is provided at each end of the line for currents which are in phase on each of the three phase wires by virtue of the closed delta winding. A line so equipped with transformers is equivalent to the closed-loop circuit on which tests were made.

The Athenia tests were on a 26-kv., 3-conductor underground cable, of the Public Service Electric and Gas Company of New Jersey. Among the items of general interest which were derived from this test are:

(1) Ground potential of a substation under fault condition when the earth connection consisted of a large inter-connected grid of buried copper wire.

(2) Coefficients of induction between an underground power cable and telephone cable which was partly aerial and partly underground.

(3) Current division between sheath and earth of the fault current of a power cable and the zero-phase sequence impedance of the cable.

A review of the progress of Project Number 3 shows that the data secured through its work should be of considerable value to operating engineers in studying their relay problems, aside from its value in inductive coordination work.

Meeting of French Electrical Association to Be Held in July

Notice has been received that a national meeting of the French Syndicat Professionnel des Producteurs et Distributeurs d'Energie Electrique will be held July 1 to 3 inclusive at Nantes (Loire-Inferieure), and American engineers are invited to take part in the meeting which will comprise an extensive list of subjects. Members of the Association who expect to be abroad at that time and who desire to participate in this meeting may have arrangements made by application to the Engineering Department, N.E.L.A. Headquarters Office, 420 Lexington Ave., New York, N. Y.

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*Of the Joint Subcommittee on Development and Research of Bell Telephone System and N.E.L.A.

Northwest Engineering Meeting

THE annual group meeting of the Engineering Section, Northwest Electric Light and Power Association was held at Walla Walla, Wash., March 25-27 with an attendance of 140.

President R. M. Boykin of the Northwest Association suggested the formation of a permanent power committee consisting of all committee chairmen to study problems which affect the Northwest as a whole, such as power needs, interconnection and economies and the interrupting capacity of oil circuit breakers. He further urged that utilities make a special effort to give employment to engineering graduates, but called the attention of educators to the shortcomings of many engineering graduates in speaking and writing English.

Several papers on alternating-current underground systems were presented. One by F. L. Rohrback described the ring-feeder system being installed in Spokane; another, by F. E. Fisher, took up the use of translators for partially converting the delta alternating-current underground distribution system in Seattle into a grid system, and a third, by H. Richter, Westinghouse Electric & Manufacturing Company, dealt with the broader engineering features of alternating-current underground distribution, including the use of network protectors and other recently developed apparatus.

Engineering of rural electrification was the subject of a paper presented by R. E. Gale for the overhead systems committee. Careful studies made by the Idaho Power Company have led that company to adopt as standard construction for rural lines 7-in., 35-ft. poles, 250-ft. spans, No. 6 hard-drawn wire and a voltage of 6,900/11,000. Such lines will serve a territory where there is an average of five customers per mile and a load of 15 kw. per square mile. The average cost per mile is $1,015.

Application of some of the more important requirements of the National Electrical Safety Code affecting overhead lines were presented in graphical form by R. J. Davidson. Dan L. Lindsley summed up the advantages of creosoted Douglas fir poles as strength, long life, non-conductivity and being fire-resistant and termite-proof. Major H. S. Bennion, director of engineering, N. E. L. A., explained the code situation. Discussion of a paper by A. L. Harding on preferred voltage standards for alternating-current systems showed clearly that operating men favor standardization, but that on many systems this involves many difficulties and great expense. Much interesting and valuable information was given in two papers on recent apparatus developments, one by C. E. Carey (Westinghouse), the other by C. W. Fick (General Electric).

The second afternoon of the meeting was given over to the accident-prevention and meter committees, each of which presented three papers of value to those interested in these fields.

That the fish problem in connection with hydro-electric developments is still a live issue in the Northwest was shown in a paper on this subject by J. E. Yates. He said that experiments with an electric fish screen have shown its practicability as a means of keeping small fish out of irrigation ditches and told of experiments under way to determine its value in diverting salmon into traps, hoists and fish ladders at the Gold Ray dam in southern Oregon, since if fish can be diverted into such devices there is no difficulty in getting them over high dams. Turbine leakage and problems of hydro-unit governing were the subjects of two other papers presented by the hydraulic power committee.

A paper on predrying of hog fuel (sawmill refuse), by W. A. Struthers, dealt with experiments on drying with flue gases hog fuel containing 46 per cent moisture. The tests indicated that from a heat-balance standpoint there was no economy over utilizing the heat in some other manner. However, the subject was said to be worth further investigation.

Two fine papers were presented by the inductive coordination committee—one, by Ellis Van Atta, dealing with radio interference caused by pin-type insulators; the other, by E. L. White, on interference caused by suspension insulators. Each paper presented a distinct contribution to the knowledge of the underlying causes of radio interference along transmission lines, outlined remedial methods and told of efforts being put forth by insulator manufacturers to aid in the solution of the problem. In order to expedite solution of the problem it is planned to build a 3000-ft. experimental line at Oregon Agricultural College and conduct a comprehensive and exhaustive series of tests with all types of insulators and at the various standard transmission voltages.

International Conference on Large Electric High-Tension Systems

THE International High-Tension Conference which was founded in 1921, under the auspices of the International Electrotechnical Commission, and which is, apart from the latter, one of the oldest and most important international bodies dealing with electrotechnical matters, will hold its fifth session in Paris, from the 6th to 15th of June next.

Former conferences took place in 1921, 1923, 1925 and 1927. At the last session, 544 members coming from 28 countries took part, this shows the exceptional and world-wide interest which is taken in the proceedings of the Conference.

The proceedings will take place in two languages, *English* and *French*, and an interpreter will be present at each meeting to give every assistance required; the organizers of the conference have been congratulated on the way in which the individual meetings for the convenience of those who attend, have been carried out in the past and the arrangements made.

The proceedings of the Conference and the papers to be presented are of such a character as will unite in general common interest producers and distributors of electricity connected with private State or municipal enterprises, Consulting Engineers and professors, makers of electrical plants and accessories and contractors responsible for the construction of electrical power stations, power lines, and interconnecting networks.

Up to the time of the preparation of this notice, 380 members from 21 countries, have already been enrolled for the June Conference, and it is anticipated that the members of the 1927 session will be exceeded. Ninety-eight papers have been sent in from 18 different countries; of these, 33 deal with the construction of material, a feature being those papers connected with generators, transformers and transformer oil 33 on the construction and insulation of lines, including electrical and mechanical features relating to switchgear, cables, bare conductors, insulators, overhead line supports of steel, concrete and wood, and problems relating to their maintenance; and 32 papers on the layout, calculation, operation and protection of lines and networks, including problems connected with lightning effects surges, protective relays, grounding of neutrals, snow loading, load despatching, measurement, and inter-station communications.

The fee for the Conference is 250 fr.

The date chosen for the Conference, June 6-15, is at the most pleasant time of the year for a stay in Paris, and in order to assist those members who come from abroad, the secretariat of the Conference will give every possible assistance in the direction of arranging in advance, for those who so desire, for accommodation in Paris to suit all pockets.

The permanent offices of the High Tension Conferences are situated at 25 Boulevard Malesherbes, Paris (close to the Madeleine). Those requiring information should write to the Organizing Secretary, M. Tribott Laspière at the above address.

Residents in the United States who wish to take part in the Conference, are requested to communicate with Mr. Mailloux, 111 Fifth Avenue, New York, in order that American engineers can be brought together regarding various matters relating to the Conference activities.

GEOGRAPHIC DIVISIONS and STATE ASSOCIATIONS

Arizona Association Meeting

THE Arizona Utilities Association met jointly with the Pacific Coast Electrical Association and the Pacific Coast Gas Association on April 4, 5 and 6, at the new El Conquistador Hotel, Tucson, Ariz.

M. A. Pooler of Tucson, retiring president of the association, in opening the convention, outlined the growth of Arizona and the progress and development of the utilities within the state, with particular emphasis on the Tucson Gas, Electric Light & Power Company, of which he is president. The principal address of the opening day was made by Paul M. Downing of San Francisco, president of the Pacific Coast Electrical Association, who declared that the utilities need fear nothing from investigations and implications of wrongdoing if they will inform the public of their work and accomplishments in a fair and impartial manner.

Important papers included one by E. B. Chase, National Lamp Works, San Francisco, on "Light, the Business Getter," illustrated with explanatory charts. A. E. Higgins, American Gas Association, outlined ways in which to educate the public in the choice of lighting equipment. George Lewis of Denver, representing the Rocky Mountain Committee on Public Utility Information, gave an interesting address, using as his subject, "Still Again, Why All the Secrecy?" He appealed to those present, when they returned to their respective companies, to pass on to others some of the things they had heard and learned by attendance at the convention.

On the second day excellent papers were read by company employees as follows, first, second and third prizes being awarded respectively to the three named: "Employees and Customers' Relations," by Wilma D. Jones and Irene Wolcott of Bisbee, representing the Arizona Edison Company; "Better Public Relations Through Association Work," by Claud H. Weber, Tucson Gas, Electric Light & Power Company; "Telling the Story," by Jack Arnold of the Central Arizona Light and Power Company, Phoenix. "Feminism in the Public Utility Field" was dealt with by Mrs. Ruth E. Creveling, San Diego, chairman women's committee, Public Relations Section, Pacific Coast Electrical Association.

Election of officers for the following year and reports of committees, as well as the annual report of Lee C. McCullough, secretary and treasurer of the association, occupied the last morning. This business session was followed by a trip to the famous cattle ranch on the Mexican border, 60 miles south of Tucson, known as the Hacienda de la Arivaca, where a specially prepared entertainment and a barbecue were given.

New officers are: President, L. V. Seares, Arizona Power Company, Prescott; first vice-president, A. F. Moriarity, Central Arizona Light & Power Company, Phoenix; second vice-president, Milton G. Sanders, Arizona Edison Company, Phoenix; secretary-treasurer (re-elected), Lee C. McCullough, secretary Arizona Industrial Congress, Phoenix.

Maryland Association Convention

THE seventh annual convention of the Maryland Utilities Association was held in Baltimore on April 12. F. F. Hennaman of the Penn Central Light & Power Company and H. S. Metcalfe of the West Penn Power Company discussed the general basis and policies involved in public relations, while R. F. Bonsall, C. H. Leatham and G. P. Mangan offered practical observations for achieving the desired results through the activities of the operating personnel. The electric, transportation, gas and water groups met separately in the morning and jointly in the afternoon.

Paul Wooton, Washington correspondent of the *Electrical World*, outlined general business conditions and the probable trend of Federal Reserve Board activities, copper price and industry developments, influence of electrical energy upon economic conditions in the coal-mining industry and related topics at the afternoon session. A. C. Roy of the Edison Lamp Works presented an inspirational sales talk on "Retail Merchandising" and pointed out some often-overlooked possibilities. "The Place of the Public Utility Under Modern Business Conditions" was noted by M. B. Lambert of the Westinghouse Electric & Manufacturing Company, with particular reference to the railway field. "Televox," the mechanical man, was demonstrated.

At the closing session following the banquet, at which Governor Albert C. Ritchie was among the guests, the Governor advocated better and more intimate relations between the utility and those served, pointing out the need for the education of the public.

President H. T. Connolly presided. The officers elected for the coming year are: President, H. A. Brooks, Potomac Electric Power Company; vice-president, R. E. Towne, Potomac Edison Company; treasurer, Frank E. Mitchell, Eastern Shore Gas & Electric Company; secretary, David Kennear, United Railways & Electric Company. L. G. Smith, Consolidated Gas, Electric Light & Power Company, is chairman of the electric group. Nearly three hundred members and guests registered for the business sessions and many more attended the banquet.

New England Division Elects Officers

CHARLES H. HODSKINSON of the Boston Edison Company was elected president of the New England Division of the N.E.L.A. at the annual meeting in Boston last week, to take office July 1. Other officers chosen were: Vice-presidents, H. E. Duren, Greenfield, Mass., and W. C. Bell, New England Power Association, Boston; treasurer, Frank L. Ball, Charles H. Tenney & Company, Boston. The next convention will be at the Hotel Griswold, New London, Conn., Sept. 9-12.

Effects of Indeterminate Franchise Principles in Oklahoma

IN his report to the 11th annual convention of the Oklahoma Utilities Association held at Oklahoma City, March 12-14, Edward F. McKay, Manager of the Association, gave the results which have followed the adoption of the indeterminate franchise principle in Oklahoma in 1925.

Mr. McKay reports that "Nearly 100 cities and towns of the State have secured electric service, and approximately the same number gas service, which had no such service prior to the meeting of the 1925 Legislature, and the passage of the revocable permit bill. Many more cities and towns previously having only part-time electric service have secured 24-hour service under operation of this law. Electric transmission line mileage in Oklahoma has increased more than 150 per cent with this law in operation and gas pipeline mileage exceeding 4-inch in size has increased more than 1500 miles. Forty million dollars of new capital has been attracted to Oklahoma, new financing being facilitated by the fact that no longer does expiration of their right to operate in certain towns before maturity of the securities offered confront companies seeking to raise funds for expansion.

"Ability to take service to the small towns and villages makes it possible to serve the farmer and the rural industry. High transmission line voltage cannot be stepped down for individual customers. Hundreds of rural industries are springing up in all sections of the State where power lines are hooking up the villages and hamlets, while service to the farmer, rapidly becoming general, is the only real 'farm relief' yet accomplished by any means, and is transforming farm life and stabilizing the distribution of population throughout the State.

"As to the effect on rates: Rate reductions for electricity have been so numerous that their exact number is uncertain, but they have affected advan-

SURGES AND FLASH-OVERS

By Fred W. Herbert

Director, Service Department NELA

Diogenes with his little lantern, if he lived in this age, would be looking for the man who had smoked his carload and hadn't coughed yet, and he would be "Lucky" if he did not have to "walk a mile."

* * *

Paper used in making U. S. currency has a folding strength in the two principal directions of over 5000 double folds. A Scotchman is responsible for this invention.

* * *

They are called ladder parties nowadays, because it is just one round after another.

* * *

Dumas rule of life: "Speak only when it is necessary and say but half of what you think."

* * *

Apropos of the discussion on Federal Regulation, Thomas Jefferson said, "Were we directed from Washington when to sow and when to reap, we should soon want bread."

* * *

Very little is known of the origin of the corn. All we know is that the start was the last.

* * *

All great successes are made with the help of somebody else's ideas.

* * *

Receipt from domestic science department—How to make a peach cordial: Buy her a dozen American Beauty roses.

* * *

The reason why some people are always borrowing trouble is because they seem to crave it.

* * *

Sign on exit door in hotel, "Stop. Have you left anything," should read, "Stop. Have you anything left."

* * *

It takes three to make a pair, provided one is a clergyman.

* * *

Why is it that so many people think that if there isn't anything wrong about a public utility, *'taint* right.

* * *

Cooperation and not competition is the life of trade.

* * *

The secret of happiness is not in doing what one likes, but liking what one has to do—Barrie.

* * *

Of the 112,000,000 people in the United States 1,304,000 are Smiths and 5.48% of these are John. If Pocahontas had not saved one it might have been less.

* * *

The sublime and the ridiculous are often so nearly related that it is difficult to class them separately. One step above the sublime makes the ridiculous and one step above the ridiculous makes the sublime again.—Thomas Paine.

tageously practically the entire electricity consuming public of the State. There has been no advance of any electric rate charged by a private company since this law became effective. There have been numerous gas rate reductions as well, and estimates of the financial saving to the public through rate reductions, electric and gas, disregarding increased consumption through decreased rates, indicate a total saving of substantially more than four million dollars. Practically seven-eighths of the amount is on the electric side of the account.

"Investigation and analysis of results must lead inevitably to the conclusion that every claim made for this measure by its proponents in 1925 has been more than justified by results that have followed its adoption."

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of N. E. L. A. Bulletin, published monthly, at New York, N. Y., for April 1, 1929.

State of New York,
County of New York.

Before me, a Notary Public in and for the State and County aforesaid, personally appeared Wilgar Coleman, who, having been duly sworn according to law, deposes and says that he is the Editor of the N. E. L. A. Bulletin, and that the following is to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are: Publisher, National Electric Light Association, 420 Lexington Avenue, New York City; Editor, Wilgar Coleman, 420 Lexington Avenue, New York City; Managing Editor, none; Business Manager, none.

2. That the owners are: National Electric Light Association, 420 Lexington Avenue, New York City, Mutual Organization, not incorporated. Membership approximately 20,000. P. S. Arkwright, President, Atlanta, Ga.; P. S. Young, Treasurer, Newark, N. J.; Paul S. Clapp, Managing Director, National Electric Light Association, 420 Lexington Avenue, New York City.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders, and security holders, as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustee, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

Wilgar Coleman,
Editor.

Sworn to and subscribed before me this 5th day of April, 1929.

(Seal) Jessie S. Riker.
Notary Public, N. Y. County.
(My commission expires March 30, 1931.)

"Of all gifts to man the greatest is the God-given faculty of organization, association and cooperation with his fellows."—*Charles W. Appleton.*

INFORMATION

The National Electric Light Association from time to time prints in pamphlet form informative, interesting articles and addresses by industrial leaders of the country, with the purpose of making them readily available to the membership of the Association.

It is felt that your public relations program will be aided through a judicious distribution of these pamphlets to the business and intellectual leaders of your city, either by direct mailing or by keeping a supply convenient for passing out to such visitors as may appear interested in reading them.

Three groups of six pamphlets each are especially recommended for this purpose, and they may be ordered in any quantity desired.

Group No. 1 consists of—

Fallacies with Regard to the Utilities (9 pages), by Howard T. Sands.
Financing the Utilities (12 pages), by Martin J. Insull.
Holding the Management Companies (52 pages), by Halford Erickson.
State Regulations of Public Utilities (30 pages), by William J. Hagenah.
Interconnection (7 pages), by George N. Tidd.
Public Utility Information Bureaus (20 pages), by H. M. Lytle.

The prices for Groups No. 1 are—

Single sets—35c.
100 or more sets—$32.50.
1000 or more sets—$30.00.

Group No. 2 consists of—

Labor's Part in Electrical Development (11 pages), by Hugh Frayne.
Shall Government Enter Business? (17 pages), by W. H. Onken.
Some Economic and Public Aspects of the Electric Industry as Viewed by a Layman (14 pages), by Melvin A. Traylor.
The Producer's Part in the Development of Power (15 pages), by J. F. Owens.
Progress, Prosperity and Horsepower (9 pages), by Lewis E. Pierson.
From Bottom Up or Top Down? (11 pages), by Merle Thorpe.

The prices for Group No. 2 are—

Single sets—15c.
100 or more sets—$12.50.
1000 or more sets—$10.00.

Group No. 3 consists of—

Electricity and the Farmer (13 pages), by Clifford V. Gregory.
Today's Science and Tomorrow's Engineering (14 pages), by L. A. Hawkins.
Driving Drudgery from the American Home (9 pages), by Mrs. John D. Sherman.
The Electrical Industry's Part in National Preparedness (13 pages), by Hon. Dwight F. Davis.
Electric Power and the Working Man (9 pages), by William Green.
That the Public May Know Us as We Know Ourselves to Be (9 pages), by J. F. Owens.

The prices for Group No. 3 are—

Single sets—18c.
100 or more sets—$15.00.
1000 or more sets—$12.50.

Sample sets will be mailed free upon request of executives of member companies.

Pamphlets may also be purchased separately at regular prices quoted in the price list of N.E.L.A. publications. This list will be mailed upon application.

NATIONAL ELECTRIC LIGHT ASSOCIATION
420 Lexington Avenue, New York

WOMEN'S COMMITTEE

Miss Sophia Malicki, *Chairman* Miss Isabel Davie, *Secretary*

News Letter

By Mrs. Thelma Van Ness

The March 22 meeting of the Women's Committee, Canadian Electrical Association, was held at the Queen's Hotel, Montreal, with an attendance of 170. Women employees of the Southern Canada Power Company at Richmond and St. Hyacinthe came to Montreal for the meeting. A pantomime was given showing how electricity speeds up the process of preparing for the day's work.

* * *

Mrs. Mabel Wilson, Chairman North Central Division Women's Committee, reports that all groups of the Women's Committee of her Division have been holding meetings regularly. All have had either a Department Head or an Executive present at these meetings. Playlets have formed a part of the entertainment and attendance has been induced by prizes in some of the groups.

* * *

Announcement is made of the formation in January of a Women's Committee in the Hawaiian Electric Company of Honolulu—incidentally America's first territorial Women's Committee. The Chairman, Miss Miriam Jackson, reports that the entire woman personnel of her Company is actively interested in the work of this Committee. An unusual feature of the Honolulu program consists of a "review question and answer contest" to be held in June, covering meetings of the previous six months. A cash prize will be awarded by the Company to the member submitting the best one-thousand-word essay.

* * *

No subject undertaken by the Pacific Coast Women's Committee has met with more widespread approval and response than First Aid. This is the first year the Pacific Coast has had representation on the Safety Subcommittee of the Women's Committee. Considerable credit is due to the consistent and persistent efforts of Miss Marge Myrick, of the San Diego Consolidated Gas and Electric Company, who has successfully promoted and maintained a high degree of interest in the subject throughout member companies of the Pacific Coast Electrical Association.

* * *

The honor of having the original Girls' First Aid Team on the Pacific Coast goes to the Los Angeles Gas and Electric Corporation girls who made their team debut at the Pacific Coast Gas Association Convention last fall. Several other teams are now hard at work, spending from four to eight hours per week perfecting First Aid technique. Women's Committees which include a First Aid Team among their activities are those in the Southern California Edison Company, Los Angeles Gas and Electric Corporation, San Diego Consolidated Gas and Electric Company, San Joaquin Light and Power Corporation, Salinas Division of the Pacific Gas and Electric Corporation and the Hawaiian Electric Company.

* * *

"Cinderella's House" is the name of a playlet in pantomime presented by the Women's Committee at the recent convention of the Kansas Section of the Middle West Division. Miss Betty Ewing of the Kansas Power and Light Company, Topeka, is the Chairman of this Division and Miss Elsie McMann of the Kansas Gas and Electric Company at Wichita directs the work of the Women's Committee in Kansas. The entire cast of this pantomime was made up of girls from these two companies. At this same meeting the Wichita Women's Committee, Kansas Gas and Electric Company, presented a First Aid demonstration entitled, "The Tragic Interlude."

* * *

Miss Cullie Clark won the public speaking contest held by the Women's Committee of the Nashville (Tennessee) Railway and Light Company. Others in the contest were Miss Dorothy Farmer, Miss Carmein Womack, Miss Jo Allyn Garner, Miss Elizabeth Wrye, Miss Mary Washburn and Miss Lottie Hamblen. All spoke on the subject "How a Woman Employee Can Help Her Company Merit the Confidence of Its Customers." *Rail-Light News* reports the contest as follows:

"Miss Clark's talk was plainly and forcefully presented, with charm and simplicity of manner as factors having weight with the judges, who were Dean Adabelle Stapleton of Vanderbilt; Jack Norman, Attorney, and Dr. W. D. Weatherford of the Southern Y. M. C. A. College.

"Not only Miss Clark's talk, but each of the seven, pointed out innumerable opportunities that women employees have for playing vital parts in our company's service to the public. The gratifying part is that the Women's Committee is seizing upon these opportunities and employing them in their every-day service to the public. The judges had a trying time choosing the winner. * * * Miss Clark will now represent the company in the State contest. * * *"

* * *

Among the Women's Committee members in the Southeastern Division who have been very active in public speaking work are several from Tennessee: Miss Selma Cohn of Memphis; Miss Susi Murphree, Miss Catherine Holloway and Miss Dorothea Lutzler of Nashville, and Miss Sylvia Richmond, Mrs. Mary M. Bushnell and Mrs. Dixie Sawyer of Chattanooga.

* * *

The New England Division comprising the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island, under the chairmanship of Miss Alice M. Baker of the Hartford Electric Light Company at Hartford, reports steady progress. In the State of New Hampshire, Miss Grace A. Phillips, Chairman, reports the organization of a new committee at the New Hampshire Gas and Electric Co., Portsmouth. Nineteen lighting schools were held in a period of two months in as many different cities in New Hampshire and Vermont at which there was a total attendance of 1316 which included several women's clubs. The program included illustrated lectures showing the proper lighting and wiring for the home and also classes in lamp shade making.

* * *

From a Southwestern Division report we learn that new committees have been organized in Sand Springs, Okla.; Olney, Tex., and Bartlesville, Okla. At Searcy, Ark., and Algiers, La., committees are in the course of formation.

* * *

The Mississippi Power Company Women's Committee gave several parties in December, one each at Gulfport, Biloxi, Hattiesburg, Columbia, Meridian and Columbus. They were called Christmas parties and the general public was invited to attend. Range demonstrations were features of the programs.

* * *

The Little Rock Women's Committee furnished a float for the parade on the opening day of the Arkansas State Fair and then used it at the Rice Carnival where it won a prize. The float represented an electric iron and members of the Women's Committee appeared on it.

* * *

The New Orleans Public Service Company Women's Committee cooperated with the Housewives' League in a three-day demonstration. Members of the Women's Committee took charge of the booth. The Housewives' League now holds its monthly meetings in the Public Service Company auditorium. Miss Julie Pailet, Chairman of the Southwestern Division, is affiliated with this company.

* * *

From the *Oklahoma Meter* of the Oklahoma Gas and Electric Company, we learn that the Women's Committee at Enid, Okla., presented "Wanted—A Stenographer" at a Kiwanis Club Luncheon recently.

* * *

The girls of the Louisville Gas and Electric Company, Kentucky, have edited their company magazine, the *Synchronizer* for the month of March.

The cover is bright green and contains many clever little silhouettes of girls in a wide variety of poses. The magazine contains an article by Fanny S. McDonald, Chairman of this group.

* * *

At Hammond, Ind., the Women's Committee of the Northern Indiana Public Service Company is holding a series of meetings at which the girls give talks on the functions of the various departments in which they are employed.

* * *

At Baker, Ore., the Women's Committee held an Open House in the Company sales room, Eastern Oregon Light and Power Company, and served coffee and sandwiches to about one hundred people. At Payette, Idaho, the Women's Committee assisted the rural salesmen of the Idaho Power Company at their farm demonstration by serving refreshments. At Albany, Ore., the Women's Committee of the Mountain States Power Company took part in the program of the Kiwanis and Rotary Clubs. The Puget Sound Power and Light Company Women's Committee boasts an active basket ball team which is a member of the City League.

* * *

Miss Mary K. Walsh, Chairman of the Women's Committee, The Washington Water Power Company, recently gave a talk on the subject "Holding Company" before the Public Speaking Class of Washington State College.

* * *

Mrs. Gertrude McDevitt, Chairman of the Women's Committee, Idaho Power Company and Home Economist for the company, has made several talks to Women's Clubs in Idaho.

* * *

The Toledo Edison Company Women's Committee reports that two women won prizes selling shares in a Customer Ownership Campaign. This group has pledged $1,250 for the new Y. W. C. A. dormitory and is raising the money by bridge parties, etc.

* * *

Miss Ruth Menoher, Director of Home Service Department, and other girls of the Iowa-Nebraska Light and Power Company, have acted as hostesses at the opening of offices in Humphrey, College View, Humboldt and Havelock. Waffle demonstrations were given at Havelock, College View and Lincoln. The girls of the Lincoln office of the company took an active part in helping the sales department put over the Edison Mazda Lamp Campaign. This group of girls is called the Live Wire Club. It was divided into teams of ten persons. Each team had a captain and a name and as an incentive in the contest, the losing teams had to entertain the winning teams at a party. One of the teams was second in the all-employee contest and was awarded a prize. This club edits a monthly bulletin entitled *Live Wire Newsette*. The Club President, Mrs. Helen Weider, is a member of the Nebraska Women's Committee and is contributing editor to the State Bulletin, *W'ats Watt in Nebraska.*

* * *

The Women's Committee of the Missouri Gas and Electric Service Company at Lexington is cooperating with the Business and Professional Women's Club and the Women's Club of the city. Nearly all the members of the Women's Committee are also members of these two clubs. The girls of the Emporia Division, Kansas Electric Power Company, are also members of the Business and Professional Women's Club. At Newton, Kan., the girls of the Idaka Club of the Kansas Gas and Electric Company are members of the Business Women's Club and two of the girls are officers.

* * *

The first executive meeting of the Women's Committee leaders in the Pacific Coast section was held at Fresno, Cal., March 21 and 22. Practically all Committee Chairmen and Members-at-Large in the State attended. Mrs. Ruth E. Creveling, Chairman, reports that the round table discussions were most interesting and profitable.

* * *

At a recent meeting of the Oklahoma Gas and Electric Company Women's Committee at Muskogee, a very interesting talk on the use of electricity on the farm was given by Mrs. Vera Carding, county home demonstration agent.

* * *

A new department has been opened at the Oklahoma City office of the Oklahoma Gas and Electric Company—the Scientific Health Department — with Greta Offut in charge. There was a recent meeting of O. G. & E. girls for the purpose of organizing a class on "Keeping Physically Fit." This is in connection with the use of the Health Stimulator.

* * *

Safety work is receiving much attention by the Women's Committee of the Illinois Northern Utilities Company. The Freeport, Ill., Women's Committee presented the playlet "Never Say Die" to the student body of the High School.

Permanent Home Making Center in New York

THE New York State Federation of Women's Clubs has recently opened a permanent Home Making Center in the Grand Central Palace, New York City.

This is the first time, it is stated, that a large institution has been set up as a definite place for the all-around study of home and home problems, where a continuous program of information and instruction is carried on. According to the announcement of the Home Making Center:

"Clergymen, doctors, psychiatrists, college professors, home economics experts in teaching, and specialists in business have offered their service to help make our dream come true. We shall have moving pictures, lectures, music, drama and poetry, fashion shows, and illustrated talks on child care and training, and, in short, a thousand subjects of interest.

"Every morning some school is coming in to see it, every afternoon a large women's club will meet here and at another hour the general public will be given the same type of program. The evenings are given over to business women and to men and their home interests and problems. It is the beginning of a new era in the consideration of Home as an entity."

Women's Committee at the Atlantic City Convention

A MEETING of the Women's Committee will be held in Atlantic City on Monday, June 3, at three o'clock in the Garden Lounge of the Dennis Hotel.

Subjects relating to all phases of Women's Committee work will be discussed by members from various sections of the country, and we hope the largest number of committee members will attend this meeting and bring to it their experiences and suggestions.

This year's convention of the National Electric Light Association is one of especial interest to women because of the observance of the Light's Golden Jubilee and the many thoughts it will give for carrying out special lighting programs in the several communities.

MAGAZINE ARTICLES

BELOW IS A LIST of articles which appeared in various magazines recently that are especially interesting to Women's Committee members:

Modern Priscilla—April
- The Lighting Problem and How to Solve It—Eloise Davison.
- The Housewife Looks at Laundry Equipment—Margaret H. Hartnett.

Good Housekeeping—April
- Are You Wire Bound—George W. Alder.

Sunset Magazine—April
- Has Your Home Adequate Refrigeration—Ernest Olmstead.

People's Home Journal—April
- Dishwashing—Elizabeth C. Condit.

Ladies' Home Journal—April
- Choosing an Electric Washing Machine—Elizabeth S. Ferguson.

Delineator—April
- What You Need to Know About Fuses and Circuits.

Better Homes and Gardens—April
- Modern Laundries Banish "Wash Day Blues"—Dorothy Knight.

Course in Electrical Household Equipment at Purdue University

By William Stokes
Manager Indiana Public Utilities Association

IN cooperation with the School of Home Economics of Purdue University, Lafayette, Ind., the electric and gas companies of the Hoosier State the last week in March acted as sponsors for a Short Course in gas and electrical household equipment at the University. Almost one hundred women employed in the gas and electric business from Indiana, Wisconsin, Michigan, Illinois and Ohio attended the course.

The course was planned primarily for women engaged in the gas and electric branches of the public utility industry in order to increase the knowledge of these women as to non-technical as well as technical information on the subjects of home economics, household equipment, and the general fundamentals of the utility business. Dean Mary L. Matthews of the School of Home Economics of the University was in active charge of the course. Manufacturers of many kinds of gas and electric operated household machinery and appliances sent liberal displays of their products to the University for the work of the Short Course.

Beginning with an address of welcome by Dean Matthews on Monday, March 25, the women attending the course were kept busy throughout the week with lectures, demonstrations and laboratory work. Many of the leaders in home economics of the country were present. In addition to Dean Matthews the following persons and their subjects appeared on the program:

"Aims of the Conference"—Miss Lois Anderson, Chairman of Indiana Division of National Electric Light Association, Indianapolis; "The Romance of the Public Utility Industry"—Morse DellPlain, Vice-President of the Northern Indiana Public Service Company, Hammond, Ind.; "The Future of Your Job in the Gas Industry"—Mrs. Anne J. Peterson, Home Service Department, Peoples Gas, Light & Coke Company, Chicago; "Gas and Its Application to Household Appliances"—E. J. Good, Sales Manager, Northern Indiana Public Service Company, Lafayette, Ind.; "Gas for House Heating"—Prof. R. B. Leckie, Gas Research Department, Engineering Experiment Station, Purdue University; "Some Points in Making a Good Demonstration"—Miss Mary I. Barber, Home Economics Department, Kellogg Company, Battle Creek, Mich.; "Cultivating Skill in Telling the Story of Gas and Electrical Equipment"—T. R. Johnston, Bureau of Publicity, Purdue University; "The Home-Maker's Use of Time"—Hildegarde Kneeland, Bureau of Home Economics, U. S. Department of Agriculture; "Electrical Units and Measurements and Their Application to Household Equipment." Prof. A. N. Topping, School of Electrical Engineering, Purdue University; "Why Save Labor"—Dr. Grace S. Zorbaugh, Professor Household Administration and Economics Science, Iowa State College.

"Gas Water Heaters" — Waldo W. Schram, Northern Indiana Public Service Company, Hammond; "Electric Water Heaters"—Prof. D. L. Curtner, Electrical Engineering Department, Purdue University; "Reliable Sources of Information on Home Equipment"—Dean Mary L. Matthews; "Mechanics of Gas and Electric Household Refrigerators"—Prof. H. J. Macintire, Department of Mechanical Engineering, University of Illinois; "Factors in the Management of Household Refrigerators"—Miss Ruth Jordan, Home Economics Department, Agricultural Experiment Station; "Fundamentals of Home Lighting"—Mrs. Frances S. Rosenburg, Home Lighting Engineer, Commonwealth Edison Company, Chicago; "Decorative Lighting in the Home"—Miss Helen G. McKinley, Home Lighting Specialist, Edison Lamp Works; "How Electricity Can Serve the Farm Homemaker"—Prof. E. W. Lehmann, Agricultural Engineering Department, University of Illinois; "The Farm Home and Electricity"—Mrs. R. M. Brown, Goshen, Ind., and "How Do We Decide What Labor Saving Equipment We Need in the Home"—Eloise Davison, Home Economics Advisor, National Electric Light Association.

In arranging the program and carrying out the work of the week Dean Matthews had the assistance of Miss Miriam Rapp of the staff of the Agricultural Experiment Station of the University. Other members of Dean Matthews' staff also assisted in demonstrations and laboratory work.

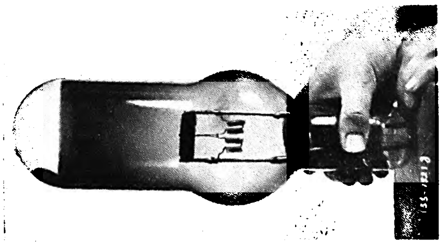
SPECIAL COMMITTEES

*Removing Blackening from Bulbs of High Wattage Lamps

THE ordinary sizes of lamps generally fail at the end of their rated average life by reason of filament rupture. With high wattage, high current lamps, such as are used in motion picture studio and aviation field lighting, the filament is relatively so thick and the bulb is relatively so small, that the end of the useful life of such lamps is not due to filament failure, but is generally caused by bulb blackening. This bulb blackening, due to the deposit of tungsten evaporated from the filament, not only causes a marked decrease in illumination, but also causes the darkened bulb to absorb a much greater amount of radiant energy from the hot filament with the result that, in many cases, the bulb devitrifies, softens and fails.

The Mazda lamp manufacturers recently have perfected a novel method of getting rid of this blackening by placing a small quantity of rough tungsten crystals in the bulb. This scheme has been considered for several years, but all the various scouring substances formerly tried, such as sand, gave off moisture or other vapors which affected the lamp deleteriously. The new construction utilizes crystals made by a new process, recently developed. When the bulb becomes appreciably blackened, the lamp is removed from the socket and rotated or shaken slightly. This causes the tungsten crystals to scour off the blackening from the inside of the bulb.

The illustration shows a blackened lamp from which part of the blackening has been scoured off. The small quantity of tungsten crystals in the bulb can also be seen.



High Wattage Lamp from Which Part of the Bulb Blackening Has Been Removed by Rotating the Tungsten Crystals in the Bulb

This development has made it possible considerably to increase the rated efficiency of high wattage lamps, as their life is now largely limited by filament failure. Lamps formerly designed for an efficiency of 26 lumens per watt will now operate at 30 and possibly as high as 32 L. P. W. and, of course, with much better lumen maintenance.

Convention Delegates Invited to S.E.D. Headquarters

KENNETH A. McINTYRE, managing director of The Society For Electrical Development, extends a cordial invitation to all members of the N.E.L.A. to visit S.E.D. headquarters at 420 Lexington Avenue, New York, while they are en route to or from Atlantic City during the June convention.

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*Contributed by Lamp Committee, Frank W. Smith, Chairman.

WHAT OCCURRED LAST MONTH

Agriculture and Electricity

An announcement by the Empire State Gas and Electric Association says that 5800 farms in New York State were added to rural electric service lines during 1928, bringing the present total to 47,800, or more than 25 per cent of all farms in the state.

* * *

Adopting the plan already put in effect by the New England Power Association and the Public Service Company of New Hampshire, the Twin State Gas and Electric Company of Dover, N. H., has put in effect the five-year monthly payment arrangement for extension of electric light and power lines into the rural districts of New Hampshire.

* * *

The annual report of President Martin of the Alabama Power Company says that 51 of the 67 counties of Alabama now have rural electrification lines. The construction of 133 new rural lines during 1928 marked the greatest progress made by the company in this direction in any one year.

* * *

Announcement is made by the American Farm Bureau Federation that Mrs. Charles W. Sewell, a farm woman from Indiana, for the last several years in charge of the Home and Community Department of the Federation, is available for public addresses on the subject, "The Development of Farm Home Life," before industrial or business groups, conventions, etc.

* * *

Earnings of Utilities

Gross earnings of public utility enterprises in February, exclusive of telephone and telegraph companies, as reported to the Department of Commerce by ninety-five companies or systems operating gas, electric light, heat, power, traction and water services, were $194,000,000, as compared with $203,000,000 in January, and $187,383,731 in February, 1928. Net earnings were $86,000,000 as compared with $74,296,576 in February, 1928.

* * *

Consolidations, Etc.

Announcement has been made of the formation of the International Hydro-electric System, as a subsidiary of the International Paper and Power Company, to take over 82 per cent of the outstanding common stock of the New England Power Association and the entire common and second preferred stocks of Canada Hydro-Electric Corporation, Ltd. The new company is formed as a Massachusetts voluntary association.

* * *

The Southern Ohio Electric Company of Athens has been given leave by the Ohio Public Utilities Commission to file an amended petition asking authority to purchase the United Ohio Utilities Company of Columbus and the Chillicothe Electric Railway, Light and Power Company.

* * *

The Commonwealth Utilities Corporation of St. Louis has purchased a controlling interest in the Arizona Power Company.

* * *

The Arkansas Power and Light Company has bought the Arkansas Public Service Company properties, the deal including light, water and ice plants in six cities in Arkansas.

* * *

An announcement made by the Fall River, Mass., Electric Light Company says that the New England Power Association and the Eastern Utilities Associates have acquired control of the Fall River Company.

* * *

An announcement of April 24 says that the United Power, Gas and Water Corporation has been formed as a $200,000,000 holding company to acquire not less than 79 per cent of the outstanding Class B common stock of the Federal Water Service Corporation, and all of the Class B common stock of the People's Light and Power Corporation. Subsidiaries of the systems involved operate in twenty-one states. George L. Ohrstrom is to be president of the new company.

* * *

Federal Power Commission

The Federal Power Commission announced that eight applications for licenses under the Water Power Act had been filed with it from March 1 to March 24, making a total of 973 received to that date. Among the applications is one of the city of Tacoma, which has applied for a preliminary permit to develop power in the South Fork of Skokomish River, fifteen miles northwest of Shelton, Washington. About 39,100 horsepower would be developed for use in the municipal system of Tacoma. Other applications are from James B. Girand, who asks for licenses for projects on the Salt River in Gila County, Arizona.

* * *

An opinion by Major L. W. Call, Chief Counsel of the Federal Power Commission, on the Commission's jurisdiction over rates and services of public service corporations, recently submitted to the Commission, has been approved by it and thereby becomes a ruling of the Commission. This opinion states that the Commission's jurisdiction over rates and services extends as far as they constitute interstate or foreign commerce and also extends to the securities of licensees, subsidiary corporations and to persons, associations and corporations purchasing power from a licensee for distribution or use in public service.

* * *

Federal Trade Commission's Investigation

On March 22, the Federal Trade Commission listened to testimony of Walter L. Frost, former president of the Pacific Coast Electrical Association, who told of activities of the association and its financial relationship with the N. E. L. A.

* * *

On March 28, at the Federal Trade Commission's hearing, N. W. Brockett, secretary of the former Washington Committee on Public Utility Information, gave testimony concerning activities of that organization, including publicity in opposition to certain proposed legislation bearing on utilities.

* * *

The Federal Trade Commission, on April 16, sent to the Senate its Thirteenth Interim Report on the public utilities inquiry. The report says that examiners have begun work on the books of a holding company in Chicago and are continuing investigation of others. It is announced that, with the completion of the publicity phase of the investigation, the financial activities of the utilities will be investigated.

* * *

On April 16, at a hearing before the Commission, a number of exhibits relating to publicity activities of electric companies in southern and western states were introduced. No witnesses were heard. On April 17, State Senator Herbert C. Jones of California testified concerning activities of California electric companies in connection with the proposed State Water Power Act.

* * *

On April 23, the Federal Trade Commission announced that hearings on publicity activities would be continued on April 25 and on May 1, and gave a list of witnesses from Pacific Coast organizations who had been asked to appear. Witnesses for April 25 were H. B. Sawyer of Boston, treasurer of the Sierra Pacific Power Company, and William T. Crawford, secretary of the same company.

* * *

The Federal Trade Commission, at a hearing on April 30, heard testimony concerning the purchase of a half-interest in the *Boston-Herald* and *Boston Traveller* by the International Paper Company, a subsidiary of the International Paper & Power Company, Mr. A. R. Graustein, president of the International Paper & Power Company, and Mr. Robert L. O'Brien, former president of the Boston Publishing Company, publisher of the papers, being the witnesses. Mr. Graustein gave a full account of the financial relationship of the International Paper Company with thirteen papers in which it has an interest, explaining that the company's motive in such relationship was to furnish an outlet for newsprint, and declaring that his company had nothing to do with editorial policies.

* * *

Foreign

The Chief Concessions Committee of the Soviet Union has recently announced a list of openings for concessions covering central power stations. These involve ten projects ranging from 20,000 to 200,000 kilowatt capacity. Some are for steam plants and others for hydro-electric development.

* * *

A report from London to the Department of Commerce says that reorganization of the generation and transmission of electricity throughout Great Britain is proceeding actively under the direction of the Central Electricity Board. It is probable that the Board will be in a position to supply electricity on a small scale in both central Scotland and southeast England (which are two of the five regional schemes) before the middle of 1929.

* * *

Hydro-Electric

At the convention of the American Society of Mechanical Engineers, held in Knoxville, Tenn., Professor J. A. Switzer of the University of Tennessee said that the recently-completed survey of the Tennessee River Basin by army engineers shows 141 separate power sites.

* * *

The Joint Water Power Committee of the Tennessee Senate and House has rendered a report to the Governor and to the Legislature on the hydro-electric situation in Tennessee. The report urges hydro-electric development of the Tennessee River Basin by private enterprise, opposes construction of the Cove Creek Dam by the federal government and also opposes imposition of a tax of one mill per kilowatt-hour on hydro-electric current.

* * *

The Government of the Province of Manitoba has decided to grant to the British Dominion Power Company the right to develop hydro-electric power at White Mud Falls, the 600,000-horsepower site on the Nelson River. The proposal calls for reservation of a large block of power for the Provincial Hydro Commission at cost. It is estimated that $20,000,000 will be invested.

* * *

A recent report to the Department of Commerce says that France is the third nation in the world, being surpassed only by the United States and Canada, in the amount of hydro-electric power generated annually. The report states that through government action France has complete coordination of development and interconnection of hydro-electric plants, whether constructed, in process of construction, or projected.

* * *

The Joint Legislative Committee on Water Conservation and Development of California has made public its report after a study of the situation over two years. The report recommends expenditure by the state of $109,000,000 for dams, power plants, flood control and irrigation.

* * *

On April 23, it was announced that the Union Electric Light and Power Company, a subsidiary of the North American Company, is planning to build a hydro-electric power plant on the Osage River, at Bagnell, Mo., at a cost in excess of $30,000,000. The power plant is to have an initial capacity of 120,000 kilowatts, with provision for additional generating units up to a total of 160,000.

* * *

Municipal Plants

Voters of Angelica, N. Y., at an election in March, rejected a proposal to sell the municipally-owned electric plant. An election at Sidney, Neb., resulted in favor of the sale of the municipal electric plant there. Chippewa Falls, Wis., has voted down a proposal to buy the privately-owned electric distribution system in that community. The towns of Claremont, Mooresville and Mocksville, N. C., have voted to sell their municipal electric distribution systems.

* * *

Investigation of the financial condition of the municipal light department of Concord, Mass., made under the direction of Director Theodore N. Waddell of the State Division of Accounts, disclosed that some 650 residents of that town owe more than $53,000 for lighting service. The bills run from one dollar to $2,185, according to the report, which also states that in some instances meters had not been read in years despite the fact that current was continually being used.

* * *

The Tennessee Legislature has passed a bill enabling the City of Jackson to spend $1,000,000 for municipal electric and gas plants.

* * *

Niagara

The Public Committee on Power of New York State has sent an open letter to Senator Wagner condemning the treaty between the United States and Canada for diversion of additional water from Niagara Falls, principally on the alleged ground that the provisions of the treaty are favorable to a private company and not to the public.

* * *

Production of Electricity

The Department of Commerce reports that the output of electric current in the United States in 1927 was 74,654,531,374 kw-hr., against 40,291,536,435 kw-hr. in 1922, an increase of 85.3 per cent. During the period from 1922 to 1926 there was a sharp decrease in the number of individual electric plants, the department reports.

* * *

The Geological Survey reports that production of electricity by public utility plants in February was 7,444,000,000, an increase of 8 per cent over February, 1928. (The increase per day in February, 1929, over February, 1928, was nearly 13 per cent, February, 1928, having 29 days.)

* * *

The United States Geological Survey reports total production of electric current by public utility plants in New England during 1928 to be 5,939,035,000 kw-hr., an increase of 8.6 per cent over 1927. Of this, 2,371,981,000 were produced by water power.

* * *

The Department of Commerce announces that the total output of electric current in New York State in 1927 was 9,917,685,550 kw-hr., an increase of 82.6 per cent over production in 1922.

* * *

The Dominion Bureau of Statistics, in a report on electric power output of central electric stations in Canada for the year 1927, says that hydro-electric stations generated 98.6 per cent of the total production of 14,549,099,000 kw-hr. The output of the central stations was slightly less than 50 per cent of the total capacity of installed equipment if operated 24 hours per day.

* * *

Rates

The Tidewater Power Company has filed with the North Carolina Corporation Commission voluntary reductions in electric power rates, effective April 1.

* * *

About 30,000 domestic and commercial consumers of electricity in northern West Virginia will have their rates lowered under a new schedule filed with the Public Service Commission by the Monongahela-West Penn Public Service Company.

* * *

The Syracuse, New York, Lighting Company and the city officials of Syracuse have reached an agreement for a substantial reduction in rates for residential service.

* * *

The municipal systems of Holyoke and Chicopee, Mass., have announced reduced rates, the initial lighting rate in each case being 5 cents.

* * *

Reduced rates for Corning, Hornell, and adjacent New York communities, offered by the New York Central Electric Corporation, have been approved by the Public Service Commission.

* * *

The Illinois Power and Light Corporation has announced reduced rates for retail power, effective April 1, and has filed the schedule with the Illinois Commerce Commission.

* * *

The Knoxville, Tenn, Power and Light Company announces new rates which will save its customers about $50,000 annually.

* * *

The municipal plant of Wolfeboro,

N. H., announces reduced rates beginning May 1. The initial rate for lighting will be 13 cents.

* * *

The Houston, Tex., Lighting and Power Company announces a new schedule of rates, which will mean a saving of about 10 per cent for residential consumers.

* * *

The Appalachian Electric Power Company has announced a voluntary reduction in power rates to affect what is known as the Bluefield district in Virginia. This will mean a saving of about $30,000 annually to consumers. This same company announces lower rates for the towns and rural communities of the Roanoke-Lynchburg division, which will mean a saving of about $74,000 to customers.

* * *

The Wisconsin Public Service Corporation is to put into effect a new rate schedule which will benefit small users of electricity in the Green Bay, Oconto, and Oshkosh districts to the extent of about $42,000 annually.

* * *

The rate reductions for agricultural power, agreed upon last year as a result of negotiations between the San Joaquin, Cal., Light and Power Corporation and the California Farm Bureau Federation, whereby farmers of San Joaquin Valley will save about $300,000 annually, went into effect April 1.

* * *

The Southern Canada Power Company of Quebec Province announces lower residential rates to go into effect on May 1. The new rate will be $1.50 per month, plus 3 cents per kilowatt-hour, and customers will be permitted to use one meter for all household uses, including lighting, cooking, refrigeration, oil burners, radios, etc.

* * *

The Union Light, Heat & Power Co. of Fargo, N. D., has filed with the State Railroad Board a schedule calling for substantial reductions in the wholesale power and light rate and the wholesale industrial power rate.

* * *

City officials of Shreveport, La., and officials of the Southwestern Gas & Electric Co., after negotiations, have reached an agreement on rates for electric light and power which will mean a saving of about $139,000 per annum.

* * *

The Laporte, Ind., Gas & Electric Co. has announced a new schedule of reduced rates, effective May 1, which has been approved by the Indiana Public Service Commission.

* * *

Regulation

A bill introduced in the Minnesota House calls for regulation of water power in the state. Regulatory power would be vested in the present Railroad and Warehouse Commission. The Committee on Public Domain of the Minnesota Senate has approved the proposal for a committee to investigate the situation in northern Minnesota for the purpose of determining a state policy on water power development.

* * *

A bill has been introduced in the Wisconsin Legislature to create the office of Public Utility Director, who would be appointed by the Governor and would serve the cities and customers of public utilities, either alone or with other agents or attorneys, in matters pertaining to rates, security issues or service. The salary and expenses of the Director would be paid from the appropriation for the Railroad Commission and he would have access to all records of the Commission.

* * *

The New Hampshire Legislature is considering a bill giving authority to the Public Service Commission to charge utility companies with the expense of investigations undertaken by the Commission as a result of petitions from the utilities.

* * *

A resolution has been introduced in the Michigan House calling for a legislative investigation into the Michigan Public Utilities Commission.

* * *

A resolution has been introduced in the Wisconsin Legislature providing for investigation of the Railroad and Tax Commissions, together with the entire subject of regulation and taxation of public utilities, the inquiry to be conducted by a special joint committee of the Legislature.

* * *

The Judicial Committee of the Missouri House has held a hearing on the bill prepared by the City Counselor of St. Louis to establish 7 per cent as the maximum rate of return for public utilities.

* * *

Dispatches from Jefferson City say that the general terminable permit bill, originally applying to all utilities except telephone companies, has been practically killed in the Missouri House by amendments which have been attached to it.

* * *

A bill introduced in the Oklahoma House provides for employment by the State Equalization Board of a qualified tax specialist to assist the proper officers in discovery of property belonging to Public Service Corporations that has not been listed and assessed as required by existing laws. The Legislature has passed and sent to the Governor the bill authorizing municipalities to own and maintain property outside of corporate limits and to issue bonds for the purchase of such property.

* * *

The New York Legislature shortly before adjournment passed the Thayer-Dunmore Bill, creating a Commission of nine members to make a survey of utility regulation in the state and to report recommendations to the next legislature.

* * *

A bill considered by the Pennsylvania Legislature, which would have required approval by the Public Service Commission of new rates before they could become effective, has been indefinitely postponed.

* * *

The Oklahoma Legislature has passed a bill authorizing municipalities to own and maintain property outside of corporate limits and to issue bonds for the same. This bill was intended primarily to enable municipalities to acquire and maintain airports outside of the city limits.

* * *

The Nebraska Senate has passed a bill that all public utility franchises awarded by cities of 5,000 to 25,000 population, also villages and cities of the second class, be for no longer than twenty-five years and that maximum rates be stated in the franchises, and that a 60 per cent vote of electors in cities of the second class, and in villages, be required for the sale of municipal plants. The Nebraska House has decided to give consideration only to such utility bills as have passed the Senate.

* * *

On April 8, the Committee on Power and Light of the Massachusetts Legislature voted for a favorable report on the bill approved by the Massachusetts Department of Public Utilities, which would rescind the present requirement of Massachusetts law that municipalities before entering the public utility business must acquire the privately-owned property serving the communities in question. According to the bill which the Committee recommends, the question of determining whether private plants shall be taken over is left in the hands of the Department of Public Utilities. The Department may say that any city or town, after the appropriate votes have been taken, may enter the electric business; the Department may determine whether the private plant shall be taken, or may even decide that even a part of an existing plant shall be purchased. The bill now goes to the Ways and Means Committee.

* * *

The New York Public Service Commission has announced that it has postponed further hearings in the matter of submetering until the early fall.

* * *

The Wisconsin Assembly has passed the bill to include public utilities in the income tax, on the same basis as other corporations. The measure now goes to the Wisconsin Senate.

* * *

New bills introduced in the Wisconsin Legislature include one limiting rates to be charged for electric current to tenants by landlords to the rates charged by utility companies for the same service; one providing for the creation of electric light and power districts to be owned and operated by groups of cities, towns, villages, or counties; one permitting municipalities to compete with existing utilities; and one permitting municipalities to install their own street-lighting without applying to the Railroad Commission.

* * *

A bill passed by the Maine Legislature, providing for export of surplus power if the proposal is ratified by the voters in September, and calling for an excise tax of 4 per cent on the selling price of the power, also provides that one half of the receipts of this tax for ten years will be devoted to the construction of rural electric service facilities, the maximum so devoted to be not more than $250,000 per annum.

* * *

A bill has been introduced in the Michigan Legislature providing for the incorporation by any two or more cities, villages or townships, or any combination or parts of the same, of a metropolitan district or districts comprising territory within their limits for the purpose of acquiring, owning and operating, either within or without their limits, parks or public utilities.

* * *

The Rushton bill, which provides for regulation of gas and electric utilities and requires them to secure from the Public Service Commission a certificate of convenience and necessity in certain cases, passed the Michigan House and Senate, but was afterwards reconsidered and amended to exclude municipal corporations from the provisions of the bill.

* * *

Bills introduced in the Minnesota Legislature prohibit raising the levels of any waters in Minnesota which are a part of international boundary waters. One object of the bills is to prevent a proposed hydro-electric development by private interests which would be based upon the use of waters along the Canadian boundary.

* * *

The special Intermin Water Power Committee of the Wisconsin Legislature has gone on record as favoring a constitutional amendment to authorize the state to take over water power sites at the end of thirty years and engage in the business of generating and distributing electric current therefrom.

* * *

St. Lawrence

The proposal made by Governor Roosevelt of New York for a Board of Trustees to work out a plan for developing water power resources on the St. Lawrence was shelved by the New York Legislature on March 26, when the Senate refused to take the bill from the committee considering it. This means no action on it for this session.

* * *

On April 10, Secretary of War Good, in an address before the Bankers' Club of Chicago, declared that according to estimates of the Army Engineers a St. Lawrence waterway suitable for ocean-going traffic can be provided for $125,000,000 to $150,000,000, after crediting the improvement with the share of costs chargeable to power. He asserted that economists calculate that 23,000,000 tons of freight would use this seaway annually.

* * *

On April 17, two resolutions bearing on the St. Lawrence project were introduced in the House of Representatives at Washington. One would put the United States government on record as being ready to proceed with the waterway as soon as Canada signifies its approval; the other provides that the report of the International Joint Commission, which, in 1922, completed and submitted a study of the project, be accepted by Congress, and further provides that President Hoover be authorized to negotiate with Canada for appointment of an International Board of Engineers to report within one year on detailed plans for construction and control of a waterway.

Virginia Rural Electrification Conference

LEADING authorities on rural electrification will take part in a conference to be held in the Agricultural Engineering Department of the Virginia Polytechnic Institute, Blacksburg, June 12, 13 and 14, according to announcement made by Professor Chas. E. Seitz, head of the V. P. I. Agricultural Department. This conference or "rural electrification short course," was arranged by Professor Seitz with the Virginia Committee on Relation of Electricity to Agriculture and The Public Utilities Association of Virginia cooperating.

This is said to be the first short course of its kind in the Southeastern States, and Professor Seitz already has assurances that there will be a large attendance from the electric utilities in Virginia, and, he hopes, adjoining States will be represented.

This short course at V. P. I. follows closely upon the conference on rural electrification called by Governor Byrd, and which resulted in the creation of the Virginia Committee on Relation of Electricity to Agriculture, whose members were drawn from the leaders of electric power companies and farm organizations in the Old Dominion.

Returns in Industrial Electric Heat Contest

THE number of submittals received in the NEMA-NELA Slogan Contest indicates a general interest in the subject of industrial electric heat on the part of many industries, according to an announcement from the National Electrical Manufacturers Association.

This contest, which closes May 30, is sponsored by the manufacturers and the National Electric Light Association to obtain a slogan descriptive of electric heat in industry. Seven prizes, totaling $500, will be awarded.

Further details of the contest were published in the March, 1929, issue of the N. E. L. A. BULLETIN, or may be obtained by writing to NEMA, 420 Lexington Avenue, New York City.

Elks Lodge Extends Invitation to Convention Delegates

THE Association is in receipt of the following communication, which has been acknowledged with appreciation:

"Atlantic City Lodge No. 276, B. P. O. Elks, extends to the Officers and members, of the National Electric Light Association, the courtesies of their Home, during their Convention, realizing they seek a certain recreation, in connection with the business they have to do with, and we would greatly appreciate it if you will make this known to them.

"Instructions will be given to our doorman to admit any of your members who shows the proper credentials of your body."

ATLANTIC CITY LODGE No. 276
B. P. O. Elks,
GEO. B. STODDARD, *Secretary.*

New Additions to List of Exhibitors

SINCE the list of exhibitors at the 1929 Convention and Exhibition was published in the April issue of the BULLETIN, the following changes have been made:

ADDITIONAL EXHIBITORS SINCE LAST ISSUE OF N. E. L. A. BULLETIN

American Ironing Machine Company	Chicago, Ill.
F. A. Bartlett Tree Expert Company	Stamford, Conn.
The Bristol Company	Waterbury, Conn.
Chicago Concrete Post Company	Chicago, Ill.
Condit Electrical Mfg. Corp.	Boston, Mass.
Curtis Lighting, Inc.	Chicago, Ill.
Dayton Pump & Machinery Corp.	Dayton, Ohio
Dexter Rubber Corp.	New York, N. Y.
Duplexalite Division of The Miller Company	Meriden, Conn.
Kellems Products, Inc.	New York, N. Y.
Liberty Gauge & Instrument Co.	Cleveland, Ohio
Master Electric Co.	Dayton, Ohio
Reading Sheet Metal Products Co.	Reading, Pa.
Silvray Company, Inc.	New York, N. Y.
Syracuse Washing Machine Co.	Syracuse, N. Y.
Trumbull Electric Mfg. Co.	Plainville, Conn.
Vacuumizer Mfg. Corp.	Rochester, N. Y.
Wilson Rubber Company	Canton, Ohio

EXHIBITORS WHO HAVE WITHDRAWN FROM EXHIBITION SINCE LAST ISSUE OF N. E. L. A. BULLETIN

Walter Bates Steel Corp.	Gary, Ind.
Central Flatiron Mfg. Co.	Johnson City, N.Y.
Hoe Corporation	Poughkeepsie, N.Y.
W. J. Loth Stove Co.	Rochester, N. Y.
Rainbow Appliance Corp.	New York, N. Y.
Seth Thomas Clock Co.	Philadelphia, Pa.
Wright Appliance Co., Inc.	Waynesboro, Va.

Picked up from

ELECTRICAL NEWS ITEMS

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Electricity in the Slaughter House

TO the average American the thought of the slaughter house of a great meat packing company is more than distasteful, and is one of the sights of the meat industry which he has no desire to see. He has visions of the passing of long lines of cattle and the monotonous swinging of a gory pole-axe by hulking brutes who do not seem quite human.

Now comes a large meat packing company in Europe which, according to Floyd Parsons, has substituted electricity for the slaughter of animals. According to veterinary surgeons the death of cattle by electrocution is instantaneous and painless. An electrode is attached to the neck and another to the spine. After intensive investigations, approval of the method has been given by the government and by the Society for the Prevention of Cruelty to Animals.

Electric Welding

THE average citizen when he hears of electric welding thinks of it only as a new process whereby the terrible noise of construction work which is constantly going on, particularly in the larger cities, will be eliminated. What he does not know is that this method of welding has been an important contributing factor in the construction of the monster electric generator of modern times.

Until comparatively recent days the makers of large generators had to cast the metal in molds, with many consequent chances for imperfections. Now the machines can be assembled in pieces and welded together by electricity, assuring a job that is one complete piece.

This method has been investigated by the National Electric Light Association. In a recent report prepared by a committee on the subject one of the manufacturing companies is quoted as follows:

"There are several reasons for the recent tremendous increase in the use of structural steel and welding as a substitute for the use of castings. The cost of constructing patterns and the expense of storing them, the loss occasioned by defects in the castings, and the likelihood of failure in service as a result of internal strains, blowholes and the like, are some of the disadvantages of the old method of construction. They have long been appreciated by the industry and have been tolerated only because of the fear that some other form of structure would give rise to other troubles of even more serious nature.

"With the development of flame cutting of steel plate and with the increased knowledge of the art of welding, however, the designers have become convinced that steel plate will not only eliminate casting defects but will also produce better mechanical structures. In fact, factory tests have demonstrated that the new method of construction eliminates the disadvantages of castings, and produces a structure superior in strength and reliability to the cast structure."

Osciographoscope Bares Human Hearts

AN electrical engineer, Edward H. Hansen, of Los Angeles, Cal., reports that he has perfected an invention by which a motion picture camera can take photographs of a heart pulsating within a living person, according to *Popular Science Monthly*. He calls his machine an osciographoscope and says it will bring about a new system of diagnosis for heart ailments.

The stethoscope records only the sound of the heart in action. The X-ray allows it to be seen, but it does not give any permanent record for study. The new device, says the inventor, will record the slightest pulsation or change in the heart, so that the picture, thrown on the screen, can be examined and studied by several physicians.

"Considered as a piece of machinery," *Popular Science* continues, "the human heart is about the most efficient part of the body. It works continuously for half a century and more; sometimes for a hundred years; without stopping to be overhauled for repairs. It is composed of muscles which are extremely tough. They expand and contract with rhythmic regularity at an average rate of seventy pulsations a minute. The average life of an American is now about fifty-five years. In that period his heart will have pulsated two billion, one hundred and forty-four million, two hundred and thirty thousand times!

"It is only 300 years since William Harvey published his discovery of the circulation of the blood, in 1628. In those three centuries we have learned about the mechanism of the heart. We know that its operation is that of a pump. Each expansion draws into the left ventricle, one of the four chambers of the heart, about four tablespoonfuls of blood which has completed its seven-minute circuit of the body and has been supplied with fresh oxygen by the lungs. The blood passes through the four chambers, being forced out into the arteries through the tricuspid valve at the top of the right auricle.

"And that is about all we really KNOW about the heart. There is still much to learn about why and how infections and nervous diseases affect its muscles and its valves, throw it out of rhythm, and tend to shorten its usefulness."

Inefficiency of Government Ownership

IN an article in the *Nation's Business*, Herbert A. Casson, editor of *Efficiency Magazine*, London, shows very clearly that government ownership of utilities does not always work any too well in these days of speed, efficiency and economy. The following are some of the interesting facts set forth by Mr. Casson:

"In Great Britain the telephone is a high speed device that has been slowed down by 17 years of government ownership.

"It suits people who are not in a hurry. But it suits no one else. A London editor said recently, 'If you are in a hurry, don't telephone—walk.'

"New York City alone, has now as many telephones as the whole of England.

"The telephone traffic in London is only 10,400,000 calls a week. This is regarded in England as a surprisingly large figure; but it is two million less than the calls that are made in one day over the telephone lines of the New York Telephone Company alone.

"The United States has one telephone to every seven persons, while Britain has only one to every twenty-seven persons.

"As for telephone rates, they are slightly higher than American rates, and they are paid for a defective, 17 per cent service.

"When I ordered my house telephone I obtained it only after 136 days, whereas, the average time in New York City is, I believe, four and one-half days.

"The telephone department has no sales manager. It has no advertising manager. So far as I know, it employs no canvassers.

"If we look across the Atlantic we see a commercial company managing both telephones and telegraphs and giving the vast area of the United States a service which is incomparably more efficient than the service supplied by governments, either in Great Britain or in any other European country.

"Here we have a first class indication of what happens when the government attempts tc conduct a business enterprise—poor service, high rates, dissatisfied customers, and the entire nation deprived of a modern necessity—real telephone service."

THE REVIEWING STAND

New Developments in Electrical Measuring Devices

Serial Report, Meter Committee, Commercial National Section, N. E. L. A. Publication No. 289-47, 32 pp., 81 illustrations. Price, 50 cents; to members, 35 cents.

A RECENT survey by the Meter Committee is the basis for this descriptive report on improvements in measuring devices. To those interested in the accuracy of energy measurements, a subject that has received attention consistent with its important place in the industry, this report brings a complete review of recent developments, such as improvements in overload accuracy, temperature compensation, voltage variation and other electrical characteristics.

As pointed out in the committee's statement, this report reveals a tendency on the part of manufacturers toward standardization of terminal chambers and connections, as to size and position as authorized in a previous report of the Meter Committee, Publication No. 278-16.

The report is profusely illustrated, showing the latest types of watt-hour, volt-amperehour, load totalizing and frequency meters as well as demand registers, instrument transformers, portable standards, other graphic instruments and miscellaneous devices.—E. S. B.

Specifications

Serial report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-49, 24 pp., 6 forms, 3 tables. Price, 40 cents; to members, 25 cents.

AS with previous reports on Specifications, the specification writer will find this report helpful in producing specifications which will clearly describe the equipment wanted and the performance expected of it under given conditions. The report includes a general outline and standard form for specifications for air preheaters, closed heaters and deaerating equipment. Material on certain related subjects also is included. This consists of a form for analysis of proposals, an index of generally accepted standards and lists of reports of investigations, all of which will be of particular interest to the specification writer or purchaser.—E. S. B.

Standards for Use in Design and Operation of Mechanical Power Plant Equipment

Serial Report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-50, 20 pp. Price, 30 cents; to members, 20 cents.

FOR the immediate benefit of engineers interested in the design or operation of the mechanical equipment of power plants, a numerical list and alphabetical index of Standards have been compiled and published in serial report form. In making this listing available, the Prime Movers Committee has selected standards from those promulgated by several of the national bodies whose standardization work is most generally recognized and which seem to best cover the equipment and material in question. The functions of these various bodies is briefly described. For the convenience of those interested, a list is included of government publications, presenting the results of scientific and technical investigations and research made by the various Government Bureaus. Lists of Bulletins published by College Engineering Experiment Stations and American Welding Society Publications, relating to Mechanical Equipment of power plants, also are included.—E. S. B.

Storage, Handling, Treatment, Inspection and Testing of Insulating Oils

Serial report, Electrical Apparatus Committee, Engineering National Section, N. E. L. A. Publication, No. 289-48, 48 pp., 27 illustrations, 4 tables. Price, 75 cents: to members, 50 cents.

THE trend in practice for the storage and treatment of insulating oils is definitely shown in this serial report which has been particularly designed to serve as a convenient guide for engineers studying this subject. Based on the methods employed by fifty-seven representative operating companies the report shows the prevailing practice on various points and also outlines minority usage.

Actual figures are given showing the consensus of operating companies. The report is made extremely practical as a guide to the busy engineer by its method of summarizing in subcaptions the prevailing practice in regard to each subject discussed in the report.

A summary of prevailing practice throughout the United States is presented in addition to tables, data, appendices and actual layout of outstanding Oil Conditioning Plants.—E. S. B.

Coal and Ash Handling

Serial Report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-43, 24 pp., 23 illustrations, 5 tables. Price, 40 cents; to members, 25 cents.

THE successful adoption by two companies of the molten slag method of removing pulverized fuel ash from the furnace is one of the most notable developments in the handling of coal and ash during the past year. This and other recent developments in methods and equipment used in coal and ash handling are described and illustrated in this report.

For stoker-fired boilers one member company gives complete maintenance costs for various types of ash hoppers and gates. Two statements are offered showing new coal handling equipment. Two member companies offer short statements on the commercial disposal of ash. A complete test is reported on a new coal distributor spout, and a statement is made regarding its operation.

The use of the drag scraper system for storing coal is steadily growing, the report shows. Statements from five manufacturers are given, covering, among other items, a motor-operated ash gate and a new vestibule-type ash hopper.—E. S. B.

Resuscitation by the Prone Pressure Method

A chart, Accident Prevention Committee, Engineering National Section, N. E. L. A. Publication No. 289-41. Three illustrations. Price: 1-9 copies 10 cents each; 10-99, 8 cents each; 100-499, 6 cents each; 500-999, 4 cents each; 1000 and more, 3 cents each. (Reduced prices for quantities apply only to one order, to one shipment, to one address, and are not cumulative.)

THIS illustrated chart briefly describes the procedure for resuscitation from electric shock, gas poisoning and drowning. It has been published as a supplement to the pamphlet, "First Aid and Resuscitation in Gas Poisoning, Electric Shock and Drowning" (NELA Pub. No. 278-57, now being revised) published jointly by the American Gas Association and the National Electric Light Association.

Printed in two colors, 12½ by 18 inches, on substantial paper, this chart is designed to arouse interest in the saving of lives by the Prone Pressure Method. By securing wide circulation within their territories for these charts, utility companies will make an important contribution to the public welfare. with attendant benefit to their own standing in the community.

A space has been left at the bottom of the chart for a one line imprint of the name of the distributing company. This imprinting may be done by the purchasing company, or, if desired, will be done by the N.E.L.A. at actual cost.—E. S. B.

Chains of Lightning. By Jonathan Brooks.

Bobbs-Merrill Co., Indianapolis, Ind.

CHAINS of Lightning is a public utility story by a man formerly connected with public utilities and in a capacity which gave him splendid opportunity from a commanding point of vantage to get a true perspective of the industry. He has been writing short stories for magazines for many years under the name of Jonathan Brooks. His real name is John Mellett and for some time he was director of the Indiana Committee on Public Utility Information. He resigned two years ago to devote all of his time to writing novels. This is his third novel and his first dealing with the public utility industry.

The author has absorbed, as no one can but do in the industry, its dominating spirit, service—service at any cost, service at any personal sacrifice. If it needs your body to stop a gap, that is what is expected of you and that is what the lineman freely offers. He may not know that a little infant is

(*Continued on page* 320)

ELECTRICANA

What Is Electricity?

"IT is very irritating to be asked so frequently 'What is electricity?'" writes the always entertaining "Meteor" in *Electrical Times,* London. "There is not the least possible excuse for the layman to be so ignorant of this simple matter, he has but to look it up in his dictionary. Here are the definitions in five popular dictionaries, Webster and the Oxford dictionary being first and second in the list:

(i) A power in nature, a manifestation of energy, exhibiting itself when in disturbed equilibrium or in activity by a circuit movement, the fact of direction in which involves polarity, or opposition of properties in opposite directions. . . . (There are 70 or 80 words more which are equally clear.)

(ii) Peculiar condition of the molecules of a body or of the surrounding ether developed by friction, chemical action, heat or magnetism.

(iii) The property of attracting and repelling light.

(iv) That power in bodies which attracts and repels substances.

(v) The name of the cause of certain phenomena of attraction and repulsion.

"Here are five perfectly clear and lucid definitions of electricity, and "Meteor" hopes that nobody will bother him with this childish question any more."

* * *

If there is still anybody too obtuse to understand, here are two more equally lucid definitions which might help, one from an American edition of Webster, the other from Funk & Wagnalls.

(vi) A dynamic material agency which, when in motion exhibits magnetic, chemical and thermal effects, and when at rest is accompanied by an interplay of forces between associated localities in which it is present.

(vii) The agency or force in nature, to which are due numerous phenomena, such as those observed when certain substances are rubbed or heated (attraction or repulsion) those in connection with moving magnets (as in production of electric light) and metallic circuits (as in telegraphy) those connected with various chemical actions (as in electrolysis), etc. These phenomena were formerly ascribed to the action of certain hypothetical media, or "fluids" but are now regarded as arising from strains or displacements in the luminiferous ether.

KITCHEN ENGINEERING

We called her "The Kitchen Mechanic"—
The cook that we hired of yore.
She baked tasty noodles, made succulent strudels
And toiled by the hot oven's door.
She fried and she roasted, she boiled and she toasted,
She did all her chores with a will.
Our Kitchen Mechanic was huge and Germanic
But had no mechanical skill!

But now in this age that's electric,
The kitchen in most of our homes
Is motored and wired, and she who is hired
Must know about currents and ohms.
With humble egg-beaters connected to meters,
With engines that ceaselessly throb
And gadgets galvanic, a Kitchen Mechanic
Instead of a cook gets the job!

—*Arthur L. Lippmann, in Judge.*

THAT INDOOR TAN CRAZE

Mary had a little lamp
With ultra vi'let ray:
She used it for a tan that she
Could get no other way.

She fell asleep one day beside
This artificial sun—
And now wherever Mary goes
They know she's too well done.

—H. I. Phillips.

HELPFUL HINTS DEPARTMENT

Phillips, who is the official wag of the New York *Sun,* also gives this information in his helpful column, The Sun Dial:

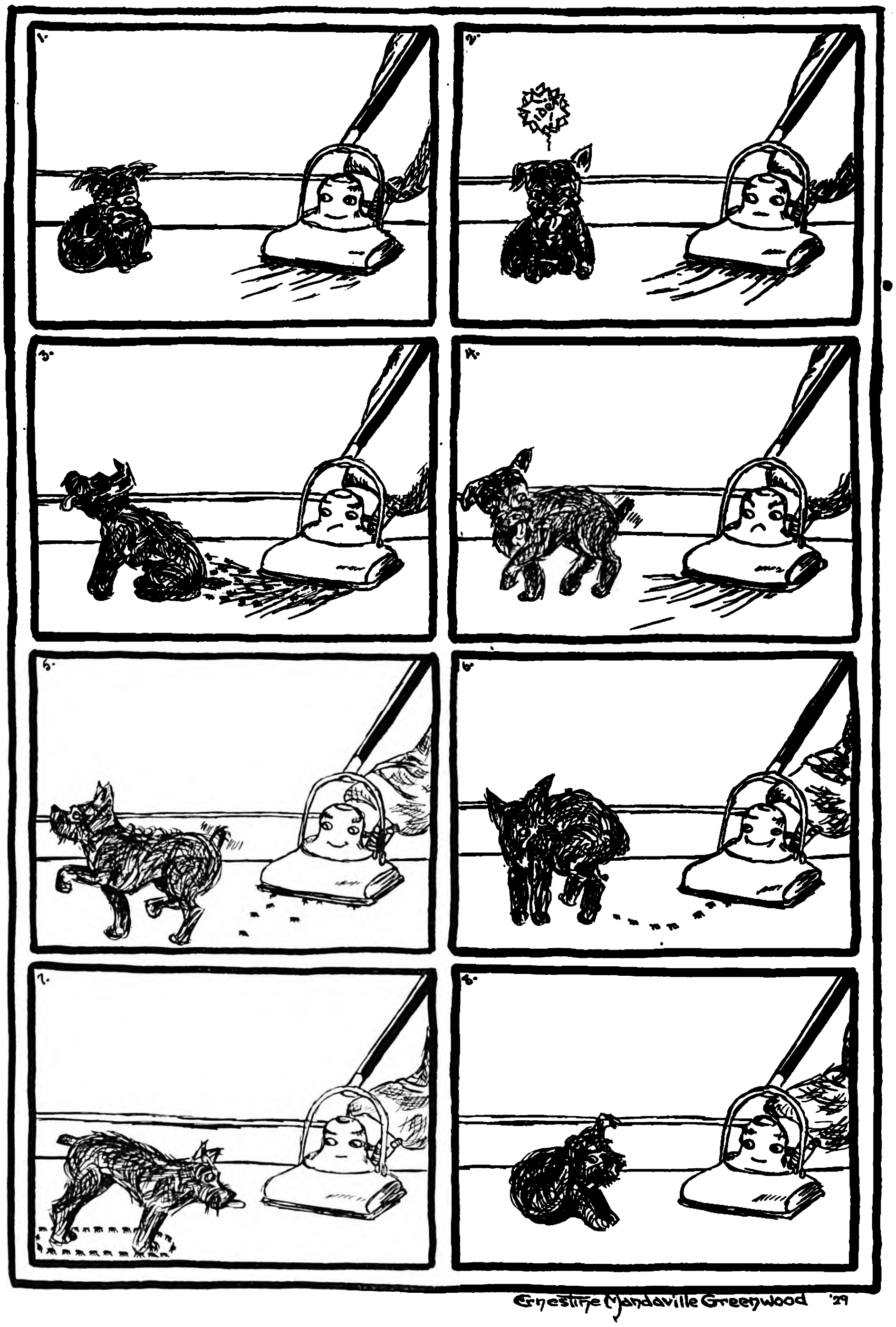
"The electric vibrator is now all the rage in physical culture cults, and this department is informed of a scofflaw who pours equal parts of gin, orange juice and bitters down his throat and then puts the vibrator belt around his tummy."

A NEW VERSION

"What's the trouble, son?" solicitously asked the electric lineman of his three-year-old boy.

"Daddy," answered the child, "I picked up a little bug, and one end wasn't insulated."—*Ex.*

THE ELECTRICAL ADVENTURES OF NAPOLEON II



He Discovers the Efficiency of the Vacuum Cleaner but Finds It Lacking in Any Spirit of Permanent Friendship

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Arkansas Utilities Association

President, W. E. BANN, Southwestern Gas & Electric Co., Texarkana, Tex.; *Secretary*, R. I. BROWN, Arkansas Central Power Co., Little Rock, Ark.

Mississippi Electric League

President, A. H. JONES, Jones-Johnson Co., McComb, Miss.; *Secretary*, A. R. RIDDICK, A. G. Riddick, Inc., Jackson, Miss.

Oklahoma Utilities Association

President, L. W. SCHERER, United Telephone Corp., Watonga, Okla.; *Secretary*, EDWARD F. McKAY, 1020 Petroleum Bldg., Oklahoma City, Okla.

Southwestern Public Service Association

President, W. H. BURKE, Stone & Webster, Inc., Houston, Tex.; *Secretary*, E. N. WILLIS, 403 Slaughter Bldg., Dallas, Tex.

***Note: This Division is in Process of Formation.**

SECTIONS, BUREAUS AND COMMITTEES

Chairmen's names only listed here

SPECIAL NATIONAL COMMITTEES

Advertising Committee—FRANK LEROY BLANCHARD, Henry L. Doherty & Co., New York, N. Y.

Charles A. Coffin Prize Committee—P. S. ARKWRIGHT, Georgia Power Co., Atlanta, Ga.

Codes and Standards Committee—IRVIN W. DAY, The Connecticut Light & Power Co., Waterbury, Conn.

Constitution and By-Laws Committee—R. F. PACK, Northern States Power Co., Minneapolis, Minn.

Electrification of Steam Railroads Committee—BRITTON I. BUDD, Public Service Co. of Northern Illinois, Chicago, Ill.

Exhibition Committee—E. W. GOLDSCHMIDT, Wagner Electric Corp., New York, N. Y.

Finance Committee—SIDNEY Z. MITCHELL, Electric Bond & Share Co., New York, N. Y.

Lamp Committee—FRANK W. SMITH, The United Electric Light & Power Co., New York, N. Y.

Prize Awards Committee—W. H. ONKEN, JR., *Electrical World*, New York, N. Y.

Public Policy Committee—R. H. BALLARD, Southern California Edison Co., Los Angeles, Cal.

Rate Research Committee—L. R. NASH, Stone & Webster, Inc., Boston, Mass.

Water Power Development Committee—PAUL A. SCHOELLKOPF, The Niagara Falls Power Co., Niagara Falls, N. Y.

Wiring Policy Committee—J. E. DAVIDSON, Nebraska Power Co., Omaha, Neb.

GENERAL NATIONAL COMMITTEES

***Civic Development Committee**—JOHN B. REYNOLDS, Middle West Utilities Co., Chicago, Ill.

***Educational Committee**—FRED R. JENKINS, Commonwealth Edison Co., Chicago, Ill.

***Insurance Committee**—W. H. SAWYER, Allied Power & Light Co., New York, N. Y.

***Membership Committee**—HOWARD K. MOHR, The Philadelphia Electric Co., Philadelphia, Pa.

***Rural Electric Service Committee**—CHARLES F. STUART, Northern States Power Co., Minneapolis, Minn.

ACCOUNTING NATIONAL SECTION

***Section's Executive Committee**—J. F. FORD, The Philadelphia Electric Co., Philadelphia, Pa.

Budget Committee—B. S. RODEY, JR., The United Electric Light & Power Co., New York, N. Y.

***Classification of Accounts Committee**—H. C. HASBROUCK, H. C. Hopson & Co., New York, N. Y.

Corporate Finance Committee—O. E. McCORMICK, Middle West Utilities Co., Chicago, Ill.

***Customers' Records Committee** — DOUGLAS BROWN, New York & Queens Electric Light & Power Co., Long Island City, N. Y.

***Fixed Capital Committee**—J. A. ROCKWOOD, Portland Electric Power Co., Portland, Ore.

***General Records Committee**—K. B. CRUMB, American Gas & Electric Co., New York, N. Y.

***Purchasing and Storeroom Committee**—W. G. YOUNG, New York & Queens Electric Light & Power Co., Long Island City, N. Y.

***Statistics Committee**—HARRY A. SNOW, The Detroit Edison Co., Detroit, Mich.

COMMERCIAL NATIONAL SECTION

***Section's Executive Committee**—MARSHALL E. SAMPSELL, Central Illinois Public Service Co., Chicago, Ill.

***Commercial and Industrial Power and Heating Bureau**—V. M. F. TALLMAN, Charles H. Tenney & Co., Boston, Mass.

Commercial Cooking Committee—O. WILHELMY, The Union Gas & Electric Co., Cincinnati, Ohio.

Electric Truck Committee—GUY W. THOMAS, Public Service Co. of Colorado, Denver, Colo.

General Power Committee—H. C. THUERK, Erie Lighting Co., Erie, Pa.

Industrial Heating Committee—J. L. FADEN, The Edison Electric Illuminating Co., Boston, Mass.

***Lighting Bureau**—T. O. KENNEDY, The Ohio Public Service Co., Cleveland, Ohio.

Commercial and Industrial Lighting Committee—J. DANIELS, The Edison Electric Illuminating Co., Boston, Mass.

Electrical Advertising Committee—C. J. EATON, Middle West Utilities Co., Chicago, Ill.

Home Lighting Committee—W. T. BLACKWELL, Public Service Electric & Gas Co., Newark, N. J.

Street Lighting Committee—R. J. MALCOMSON, Public Service Co. of Northern Illinois, Chicago, Ill.

***Merchandising Bureau**—FRANK D. PEMBLETON, Public Service Electric & Gas Co., Newark, N. J.

Domestic Electric Range Committee—F. A. COUPAL, Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.

Merchandise Sales Committee—C. L. HAROLD, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

Refrigeration Committee—C. L. DUNN, The Ohio Public Service Co., Cleveland, Ohio.

Water Heating Committee—NORMAN T. WILCOX, Stone & Webster, Inc., Boston, Mass.

***Customer Relations Committee**—H. T. EAST, Public Service Co. of Northern Illinois, Chicago, Ill.

Promotional Rates Committee—E. W. LLOYD, Commonwealth Edison Co., Chicago, Ill.

***Wiring Sales Committee**—A. P. GOOD, Commonwealth Edison Co., Chicago, Ill.

ENGINEERING NATIONAL SECTION

***Section's Executive Committee**—E. C. STONE, Duquesne Light Co., Pittsburgh, Pa.

***Accident Prevention Committee**—C. R. BEARDSLEY, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

***Electrical Apparatus Committee**—J. A. JOHNSON, The Niagara Falls Power Co., Niagara Falls, N. Y.

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***Hydraulic Power Committee**—BYRON E. WHITE, Utica Gas & Electric Co., Utica, N. Y.

***Inductive Coordination Committee**—H. L. WILLS, Georgia Power Co., Atlanta, Ga.

***Meter Committee**—E. E. HILL, The New York Edison Co., New York, N. Y.

***Overhead Systems Committee**—HAROLD COLE, The Detroit Edison Co., Detroit, Mich.

***Power System Engineering Committee**—L. W. W. MORROW, *Electrical World*, New York, N. Y.

***Prime Movers Committee**—E. B. RICKETTS, The New York Edison Co., New York, N. Y.

Special Engineering Research Committee—C. F. HIRSHFELD, The Detroit Edison Co, Detroit, Mich.

***Underground Systems Committee**—J. W. SYLVESTER, The Philadelphia Electric Co., Philadelphia, Pa.

Public Relations National Section

***Section's Executive Committee**—J. F. Owens, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

***Cooperation with Educational Institutions**—Carl D. Jackson, 36 West 44th Street, New York, N. Y.

***Customer Ownership**—W. H. Hodge, Byllesby Engineering & Management Corp., Chicago, Ill.

***Industrial Relations Committee**—Homer E. Niesz, Commonwealth Edison Co., Chicago, Ill.

***Information Bureau Organizations Committee**—T. A. Kenney, Allied Power & Light Corp., New York, N. Y.

Manufacturers' Advertising Committee—T. J. McManis, General Electric Co., Schenectady, N. Y.

***Public Speaking Committee**—W. S. Vivian, Middle West Utilities Co., Chicago, Ill.

***Relations with Financial Institutions Committee**—A. W. Robertson, Westinghouse Electric & Manufacturing Co., New York, N. Y.

***Women's Committee**—Miss Sophia Malicki, Middle West Utilities Co., Chicago, Ill.

***Provision is made for a representative from each Geographic Division.**

CONVENTIONS AND MEETINGS

Meeting of the Section, Bureaus and Committees of the National Electric Light Association are shown in roman type; those of other associations in italics

1929

May

7–9 ***American Institute of Electrical Engineers, Regional Meeting, Dallas, Texas.***

7–10 East Central Geographic Division, Brown Hotel, Louisville, Ky.

8–10 Southeastern Geographic Division, Asheville, N. C.

13–15 ***American Society of Mechanical Engineers, Rochester, N. Y.***

13–16 ***National Fire Protection Association, Memphis, Tenn.***

13–16 ***National Fire Protection Association, Memphis, Tenn.***

13–24 Industrial Heating School, Case School of Applied Science, Cleveland, Ohio.

16–17 Commercial Section, Eastern Geographic Division, Benjamin Franklin Hotel, Philadelphia, Pa.

16–18 Missouri Association of Public Utilities, Sadalia, Mo.

20–25 ***National Electrical Manufacturers Association, The Homestead, Hot Springs, Va.***

27–31 ***National Electrical Wholesalers Association, The Homestead, Hot Springs, Va.***

27–31 ***General Federation of Women's Clubs, Swampscott, Mass.***

31 Commercial Section, Great Lakes Geographic Division, Indianapolis, Ind.

June

3 Women's Committee, 2.30 p. m., Garden Lounge, Dennis Hotel, Atlantic City, N. J.

3 Accident Prevention Committee, 9.30 a. m., Traymore Hotel, Atlantic City, N. J.

3 National Executive Committee, luncheon-meeting, 1 p. m., Ballroom, Ritz-Carlton Hotel, Atlantic City, N. J.

3 Rural Electric Service Committee, 2.30 p. m., Traymore Hotel, Atlantic City, N. J.

3 Rate Research Committee, Traymore Hotel, Atlantic City, N. J.

3 Accounting National Section, Executive Committee, 3 p. m., Westminster Hall, Chelsea Hotel, Atlantic City, N. J.

3 Commercial National Section, Executive Committee, 3 p. m., Room No. 2, Ritz-Carlton Hotel, Atlantic City, N. J.

3 Engineering National Section, Executive Committee, 3 p. m., Room No. 1, Ritz-Carlton Hotel, Atlantic City, N. J.

3 Public Relations National Section, Executive Committee, 3 p. m., Ballroom, Ritz-Carlton Hotel, Atlantic City, N. J.

3–7 Annual Convention and Exhibition, NATIONAL ELECTRIC LIGHT ASSOCIATION, Municipal Auditorium, Atlantic City, N. J.

4 ***Board of Directors, Society for Electrical Development, Traymore Hotel, Atlantic City, N. J.***

5 Class "D" Members (Manufacturers), 12.30 p. m., Municipal Auditorium, Atlantic City, N. J.

5 State Public Utility Information Directors, 1 p. m., Club Room, Hotel Traymore, Atlantic City, N. J.

6 Public Policy Committee, luncheon-meeting, 1 p. m., Ballroom, Ritz-Carlton Hotel, Atlantic City, N. J.

10–15 ***Westinghouse Agent-Jobber's Association, The Homestead, Hot Springs, Va.***

14 ***Board of Directors, Society for Electrical Development, New York, N. Y.***

16–18 North Central Geographic Division, Breezy Point Summer Resort, Pequot, Minn.

18–21 ***Society of Automotive Engineers, New York, N. Y.***

19–21 Canadian Geographic Division, Algonquin Hotel, St. Andrews-by-the-Sea, N. B.

19–22 Pacific Coast Geographic Division, Del Monte, Cal.

20–21 Accounting Section, Wisconsin Utilities Association, Sheboygan, Wis.

24–28 ***American Society for Testing Material, Atlantic City, N. J.***

24–28 ***American Institute of Electrical Engineers, Swampscott, Mass.***

26–29 Northwest Geographic Division, Seattle, Wash.

July

1–4 ***American Society of Mechanical Engineers, Salt Lake City, Utah***

1–5 ***American Home Economics Association Convention and Exhibition, Statler Hotel, Boston, Mass.***

18–19 Electric Section, Wisconsin Utilities Association, Hotel Wausau, Wausau, Wis.

August

27–30 ***National Association of Railroad and Utilities Commissioners, Glacier National Park Hotel, Glacier National Park, Mont.***

September

4–6 Pennsylvania Electric Association, Bedford Springs Hotel, Bedford Springs, Pa.

9–11 Rocky Mountain Geographic Division Hotel Colorado, Glenwood Springs, Colo.

9–12 New England Geographic Division, Hotel Griswold, New London, Conn.

9–13 ***American Society for Steel Treating, Cleveland, Ohio.***

9–14—***Association of Edison Illuminating Companies, Quebec, Canada.***

19–20 Empire State Gas and Electric Association, Saranac Inn, Saranac Lake, N. Y.

23–30 ***American Electric Railway Association Convention and Exhibit, Municipal Auditorium, Atlantic City, N. J.***

30 ***National Safety Council, Stevens Hotel, Chicago, Ill.***

October

1–4 ***American Electric Railway Association Convention and Exhibit, Atlantic City Auditorium, Atlantic City, N. J.***

1–4 ***National Safety Council, Stevens Hotel, Chicago, Ill.***

7–10 ***Third National Fuels Meeting, American Society of Mechanical Engineers, Bellevue-Stratford Hotel, Philadelphia, Pa.***

14–18 ***American Gas Association, Atlantic City, N. J.***

NEW MEMBERS

Employees of Electric Light and Power Companies (Class B)

Alabama, River Falls, River Falls Power Company
  Chas. L. Thesing
Arizona, Tucson, The Tucson Gas Electric Light & Power Co.
  A. E. Morrison
California, Fresno, San Joaquin Light & Power Corp.
  F. C. Foy
  G. W. Hayden
  A. Jerome (Los Banos, Cal.)
  W. McElligott (Bakersfield, Cal.)
  H. M. Phillips (San Joaquin, Cal.)
  L. C. Streit
  A. R. Theile (Bakersfield, Cal.)
California, San Diego, San Diego Consolidated Gas & Electric Co.
  M. A. Bent
  W. Cooper
  F. M. Cota
  S. A. Fay
  G. L. Gerwig
  W. J. Gilmour
  R. C. Heuler
Illinois, Dixon, Illinois Northern Utilities Company
  C. J. McLean
Illinois, Springfield, Central Illinois Public Service Company
  T. M. Brady (Beardstown, Ill.)
  N. B. Elliott (Beardstown, Ill.)
  H. J. Musgrove (Beardstown, Ill.)
  W. B. Rich (Beardstown, Ill.)
Kentucky, Hazard, Kentucky & West Virginia Power Company
  R. E. Hodges (Pikeville, Ky.)
Maine, Presque Isle, Main & New Brunswick Electrical Power Co., Ltd.
  R. E. Ayers (Fort Fairfield, Me.)
Massachusetts, Athol Gas & Electric Company
  A. K. Richards (Orange, Mass.)
  H. O. Robinson
Massachusetts, Boston, Edison Electric Ill'g Co of Boston
  E. B. Dolan
Massachusetts, Boston, Stone & Webster, Inc
  P. M. Wentworth (Jacksonville, Fla.)
Massachusetts, Cambridge, Cambridge Electric Light Co.
  G. I. Darling
Massachusetts, Worcester, The Worcester Electric Light Company
  H. D. Gilbert
Michigan, Detroit, The Detroit Edison Company
  R. H. Dornbrook
  Carl Radtke (Dearborn, Mich.)
  James Reardon
Minnesota, Pine City, Eastern Minnesota Power Corp.
  M. G. Daniels
  Marion Lones
Montana, Great Falls, Great Northern Utilities Company
  A. H. Sikes
New Jersey, Asbury Park, Eastern New Jersey Power Company
  Lois E. Ryan
New Jersey, Atlantic City, Atlantic City Electric Company
  W. P. Sadler
New Mexico, Clovis, New Mexico Utilities Company
  F. E. Sleeper (Portales, N. M.)
New Mexico, Santa Fe, New Mexico Power Company
  O. B. Summers
New Mexico, Socorro, New Mexico Public Service Co.
  J. O. Rohn (Hot Springs, N. M.)
New York, Albany, New York Power & Light Corporation
  E. L. Renaud (Cohoes, N. Y.)
New York, Buffalo, Buffalo General Electric Company
  E. N. Compton
New York, New York City, Electric Bond & Share Co.
  C. E. McBride
New York, New York City, The New York Edison Co.
  A. L. Anderson, Jr. (Brooklyn, N. Y.)
New York, New York City, The United Electric Light & Power Company
  G. A. Hughes (Springfield, L. I.)
  F. W. Stuart (Bronx, N. Y.)
Ohio, Canton, The Ohio Power Company
  E. G. Schaub
Ohio, Lancaster, The Ohio Power Company
  B. S. Watters (Lancaster, Ohio)
Ohio, Toledo, The Lake Shore Power Company
  Geo. DeVries (Wauseon, Ohio)
  R. E. Johnson (Wauseon, Ohio)

Ohio, Toledo, The Toledo Edison Company
Paul Gravelle
H. K. Jorris
E. L. McBee
R. C. Shock
Oregon, Baker, Eastern Oregon Light & Power Company
O. D. Lanning
R. W. Leep
Sterling May
Oregon, Portland, Pacific Power & Light Company
Chas. M. Sanford
Oregon, Portland, Portland Electric Power Company
C. P. Dunn
Pennsylvania, Chester, Delaware County Electric Company
Joseph Carr
Pennsylvania, Wyncote, Philadelphia Suburban Counties Gas & Elec. Co.
Bert Avery (Wyncote, Pa.)
Frank B. Altemus (Norristown, Pa.)
A. S. Benjamin (Norristown, Pa.)
A. C. Bower (Chester, Pa.)
Jacob Bryan (Wyncote, Pa.)
Elias Burak (Wyncote, Pa.)
M. A. Carlisle (Wyncote, Pa.)
Joseph Ciganick (Wyncote, Pa.)
Benj. J. Clayton (Wyncote, Pa.)
John Creighton (Wyncote, Pa.)
E. Curtis Darrah (Wyncote, Pa.)
S. E. Davis (Jenkintown, Pa.)
John Delaney (Wyncote, Pa.)
John De Musz (Wyncote, Pa.)
John A. English (Ardmore, Pa.)
Franklin Field (Ardmore, Pa.)
John Fox (Wyncote, Pa.)
C. V. Fryer (Norristown, Pa.)
P. A. Fusselman (Philadelphia, Pa.)
G. W. Giess (Norristown, Pa.)
Frank N. Gore (Coke Oven, Chester, Pa.)
H. William High (Wyncote, Pa.)
Lester T. Houser (Norristown, Pa.)
Earle Lewis (Wyncote, Pa.)
Paul G. Locke (Wyncote, Pa.)
Milton H. Lutz (Ardmore, Pa.)
Wm. V. McGee (Wyncote, Pa.)
Wm. McIntire (Philadelphia, Pa.)
A. T. McLaughlin (Wyncote, Pa.)
Joseph Mahney (Wyncote, Pa.)
Geo. L. Maxwell (Philadelphia, Pa.)
Alex Morrow (Wyncote, Pa.)
James B. Murray (Norristown, Pa.)
Ruth Neely (Langhorne, Pa.)
Benj. Newman (Wyncote, Pa.)
Ed. N. Niederer (Wyncote, Pa.)
James O'Neil (Norristown, Pa.)
Harvey Ott (Wyncote, Pa.)
Thomas M. Redmond (Norristown, Pa.)
R. G. Rincliffe (Chester, Pa.)
J. Walter Roberto (Wyncote, Pa.)
Walter E. Scott (Newtown, Pa.)
Chas. K. Shane (Wyncote, Pa.)
Harry R. Sholler (Wyncote, Pa.)
Geo. A. Simmons (Chester, Pa.)
L. LeRoy Slemmer (Phoenixville, Pa.)
Gordon Smith (Wyncote, Pa.)
Richard G. Stafford (Chester, Pa.)
A. Ray Thomson (Chester, Pa.)
J. Arnold Todd (Jenkintown, Pa.)
Frank Trymbiski (Wyncote, Pa.)
Lawrence L. Tucker (Norristown, Pa.)
Howard W. Worthington (Wyncote, Pa.)
E. Gresson Zimmerman (Norristown, Pa.)
Pennsylvania, Philadelphia, The Philadelphia Electric Company
Jay O. Achenbach
E. B. Arscott
David A. Barlow (Chester, Pa.)
John Carrol Betts
Wm. J. Boyce, Jr.
E. H. Britten
Lawrence A. Brogan
Warren Brown (Morton, Pa.)
W. G. Brown
C. R. Coles
L. B. Eichengreen
J. G. Fisler
Hubert Kempel
E. G. Lundis
A. E. Marshall
John W. Miller
Joseph Mitchell
Walton R. Phillips
W. H. Poole
C. T. Roeschen
A. W. Sampson
G. R. Sidwell
G. H. Taylor
John C. Wolf (Morton, Pa.)
John S. Yard
Joseph H. Zar
Pennsylvania, Philadelphia, United Gas Improvement Company
K. R. Knapp
C. C. Winterstein
Pennsylvania, Pittsburgh, West Penn Power Company
C. E. Nixon
South Dakota, Huron, Northwestern Public Service Company
W. E. Kindley (Yankton, S. D.)
Texas, Forth Worth, Texas-Louisiana Power Company
E. A. Cain (Yoakum, Tex.)
Texas, San Antonio, San Antonio Public Service Company
Maurine McFarland (Goerne, Tex.)
Virginia, Richomnd, Virginia Electric & Power Company
Alfred E. Shaw
Washington, Seattle, Puget Sound Power & Light Company
Lawrence J. Pierce
West Virginia, Charleston, Appalachian Electric Power Company
Gould Ellis
Julius Hall, Jr. (Bluefield, W. Va.)
Canada, Moncton, N. B., Moncton Tramways Electricity & Gas Co., Ltd.
H. E. Redmond, Esq.

Manufacturers (Class D)
Ohio, Cleveland, The Cinderella Washing Machine Company

Employees of Manufacturing Companies (Class E)
Connecticut, New Britain, Landers Frary & Clark
Robert M. Chesler (Portland, Ore.)
Connecticut, New Haven, The Whirldry Corporation
G. W. Keller
A. H. Lockley
Illinois, Chicago, American Ironing Machine Company
Benjamin R. Bowman (Cleveland, Ohio)
Massachusetts, Boston, The Dampney Company of America
W. H. Caldwell (New York, N. Y.)
H. P. Kauffman (Philadelphia, Pa.)
Massachusetts, Worcester, M. S. Wright Company
Harry A. Bell
T. P. Calhoun (Philadelphia, Pa.)
C. H. LaFrance (Pittsburgh, Pa.)
A. D. Wassal
C. L. Wright (Boston, Mass.)
New York, New York City, General Outdoor Advertising Company
Wm. E. Beehan
Joseph E. Dewey
New York, Schenectady, General Electric Company
J. W. Savage (Bridgeport, Conn.)
Ohio, Canton, Union Metal Mfg. Company
L. Mitchell (Dallas, Tex.)
F. Thos. Turner (Chicago, Ill.)
C. A. Williams (Atlanta, Ga.)
Ohio, Cleveland, The Kayline Company
Benj. F. Klein
Pennsylvania, East Pittsburgh, Westinghouse Electric & Mfg. Company
Chas. C. Boozier (San Francisco, Cal.)
Frank P. Colville (Columbus, Ohio)
M. L. Donaldson (Houston, Tex.)
F. A. Ferguson (Denver, Colo.)
Cecil Gray (Richmond, Va.)
L. D. Harrison (Chicago, Ill.)
Louis C. LaMont (San Francisco, Cal.)
Geo. F. Leake (Memphis, Tenn.)
W. C. Looney (Dallas, Tex.)
W. C. McGraw (Tulsa, Okla.)
P. B. Munson (Tacoma, Wash.)
Walter O. Peale (Baltimore, Md.)
H. C. Soule (Rio de Janeiro, Brazil)
Pennsylvania, Pittsburgh, Hubbard & Company
Paul A. Lockwood (Rosindale, Mass.)
Pennsylvania, Pottstown, Automatic Electric Heater Company
W. C. Sears
Wisconsin, South Milwaukee, Line Material Company
Fred D. Emory (Denver, Colo.)
Canada, Toronto 2, Ontario, Canadian General Electric Co., Ltd.
M. J. McHenry, Esq.

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New York, New York City, Cinderella Appliances Corporation
Oklahoma, Tulsa, Taylor-Easterling & Co., Inc.

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Massachusetts, Boston, Stone & Webster Engineering Corp.
Vern E. Alden (Waban, Mass.)
Elbert G. Allen (Boston, Mass.)
R. E. Argersinger
R. H. Barclay
W. H. Blood, Jr.
Louis H. G. Bouscaren (Chicago, Ill.)
Nathan Cheney
Frank S. Clark
John T. Croghan (Waban, Mass.)
E. B. Elliott
H. A. Hageman
R. E. Hamilton (New York, N. Y.)
John C. Hays
James H. Hood
W. B. Hopkins
A. C. Klein
Norman A. Lougee
M. J. Lowenberg
G. O. Muhlfeld (New York, N. Y.)
E. W. Norris
Joseph Pope
E. B. Powell
H. L. Rogers
C. J. Sittinger (Winchester, Mass.)
L. O. Waite
R. L. Weber
Massachusetts, Boston, Stone & Webster Engineering Corp.
Albert B. Williams
R. R. Wisner
H. B. Wood
Minnesota, Minneapolis, Page & Hill Company
James K. Hill
New York, New York City, Stevens & Wood, Inc.
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Oklahoma, Tulsa, Taylor-Easterling & Co., Inc.
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John Stephens Just
England, Worcestershire, The Shropshire, Worcestershire & Staffordshire Elec. Power Co.
Argentine Republic, Rosario, Sociedad De Electricidad De Rosario

Employees of Foreign Members (Class I)
Australia, Melbourne, Victoria, Melbourne Electric Supply Co., Ltd.
David Elias Williams

Chains of Lightning

(*Continued from page* 315)

depending on the invisible juice to keep life fluttering, he may not know that a vital industry is depending on its unceasing flow. Maybe nothing depends on it for the moment. All may be in bed asleep and comfortable. But it is not his business to stop and find out. His job is to keep the unseen atoms pulsating.

Thomas O'Neill, grizzled veteran, is the guardian of the service in a mountain city. One can see the light of battle in the old man's eye as he heads his crew at midnight in mid-winter through a blizzard across mountains to find two parted wires. O'Neill is one of those "To-hell-with-them" Irish, whose prototypes of any race we encounter in every trouble shooting line gang, loyal to their job and to their company, expressing it possibly too forcibly sometimes by a crack on the jaw of its detractor.

Facing everything that O'Neill and his trouble shooters have faced in the way of material danger and facing in addition the problem of keeping the vast network of companies functioning and fed with the sinews of capital, Jase Wheeler rises a mighty figure. Damned, villified, suspected, Jase, too, keeps the juice flowing. At the head of the vast organization it is his job to keep the investment funds pouring into the industry, to keep the intricate mechanism operating and expanding, to keep the costs of service trending downward in order to invade new fields. Jase has found that his best weapon is to ignore the villifiers who nibble at his toes, the grafters, the evangelists wearing tinsel halos and breathing and spreading hate and envy and rancor.

A charming love story forming a vital part pervades the novel.

The lesson to the public utility man is "Don't let them get your goat." Maybe you will go down to your grave followed by snarls of invective.

But keep the juice flowing.—J. C.

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THE PRESIDENT'S PAGE

Hail and Farewell

AS President of the National Electric Light Association, I have run my course. I have tried to keep the faith.

Without reference to where the credit belongs, the Association is in better condition at the end of the year. Naturally, it progresses, it improves each succeeding year. But, it seems to me, there is more spirit of cooperation among the membership, more willingness for each to give of his best for the benefit of all, a greater determination to render more general, more economical and more useful service.

The office of the President of the National Association is one of distinction and honor. I have had great pride in holding it. I will cherish the memory of it.

All over the United States I have had the privilege of meeting and mingling with the people engaged in this industry. My admiration for them is unbounded. They are men and women of outstanding character, integrity and high ideals, persistently seeking to do an increasingly better and more serviceable job.

They have been kind, considerate and generous to me. As recompense, I relinquish the Presidency of their Association to a better man. I bid you farewell and thank you from the bottom of my heart for your partiality and kindness.

P S Arkwright

President.

N·E·L·A· BULLETIN

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NATIONAL ELECTRIC LIGHT ASSOCIATION

A Voluntary Organization of Companies Engaged In, and Individuals Affiliated With, or Interested In, the Electric Light and Power Industry: "Organized to Advance the Art and Science of the Production, Distribution and Use of Electrical Energy for Light, Heat and Power for Public Service."

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Lexington	5035	J. O'R. Coleman and Engineering Department
Lexington	3312	Editorial Department

Preston S. Arkwright

THE job of being president of the National Electric Light Association is no easy one, for the Association is an organization which makes many and arduous demands upon its leader. To fill the office worthily requires all the characteristics of integrity, leadership and initiative which are associated with successful men of affairs, plus a profound knowledge of the electrical industry, an intimate understanding of the Association, its works and possibilities, and a humanitarian outlook upon life.

The Association is mindful of the high position of its president and is jealous to see that none unworthy in personal characteristics or unproved in highest executive ability attains to it. No greater praise could be offered a man than to say he has served the Association according to his best abilities. This, Preston S. Arkwright has done during the past year, adding, by his brilliant administration, lustre to the highest traditions of a line of notable predecessors.

A Constructive Move

WITH minor exceptions, each kilowatt hour sold is conducted to its point of ultimate utilization by means of circuits that are governed as to their type and quality, and therefore their cost, by the National Electrical Codes and the municipal ordinances on house wiring. Adequate wiring, adequately laid out upon sound commercial and engineering principles is indispensable for the development of the load densities clearly dictated by modern practice. It is equally indispensable that the development of this link in the chain of supply shall not be hampered by other considerations than the necessary provisions for safety in order that the whole industry may profit, not only by the full utilization of all existing means for promoting complete wiring, but also by the prompt utilization of all meritorious improvements in the art.

As a part of this general constructive program which must inevitably benefit all elements of the electrical industry, the member companies of the Association have realized that it is incumbent upon them to undertake a positive and constructive part in the formulation of the codes governing house wiring where before their interest had been rather passive than active. The organization of a corps of direct representatives of member companies is an important element in this participation which will provide a channel for the direct transmission of the views and the necessities of operating companies, as an adjunct to the ordinary channels of committee procedure. The latter, as in the past, are charged with the responsibility for the more deliberate formulation of Association policies. The corps of company code representatives, moreover, is already proving to be an efficient agency for the collection of field data, and as code provisions should normally be based upon actual experience, this function will prove to be a most important one.

The Professional Motive

MEN everywhere, who are in positions of leadership, have come to make their ideal greater than themselves. It is a question with them of what is right, what will contribute most to the permanent welfare of the community. There are exceptions, of course, but if you look at the truly great leaders, you will find their goal has absorbed even their interest in themselves. Thomas Edison long ago forgot self in the pioneering efforts which absorbed his life.

Great problems confront them and press for solution on every hand. An individual may want to contribute the maximum service, to do what is right, but the decision calls for rare judgment.

* * *

The professional motive is something bigger than the individual who possesses it, something outside of him, which takes possession of him, absorbs him in its inspiration. He acts freely, not under compulsion as a slave or man with a vicious habit. He willingly and gladly stakes his property and his comfort. It caused a brilliant medical man to spend his life among the Kentucky mountaineers in comparative poverty; it caused a business man to give up a splendid position to become a college administrator; it caused a man like Munsey to culminate his life by giving his millions to art; and it has caused many a man so to devote himself to his business, so to apply his energies, as to fulfill his dream of a business of maximum service to the community. The sporting element is always present. The professional motive does not calculate, does not weigh chances and risks like a book-maker at a race, or a cock fight. The professional man plants his feet upon a law of the universe, a great ideal, and defies chance, accident and fate.

* * *

Charles W. Eliot, one of America's keenest observers of human nature, one time wrote: "The gypsy in Asia Minor makes iron nails one at a time with hammer on an anvil, much as his ancestors did before him for hundreds of years. I have seen him doing it; but I also observed that his small children were stark naked and that his larger ones had only one garment. . . . In industry and commerce all things are become new."

The one tradition which we should hold inviolable is the tradition of constant change. It will inevitably lead in the great industry which you represent, to the adoption of a professional motive on the part of your leaders—a motive which will still further develop your service, and aid in raising the level of our nation.—Deane W. Malott.

MATTHEW S. SLOAN
President-Elect, National Electric Light Association

N·E·L·A·
BULLETIN

June, 1929 Vol. XVI No. 6

N.E.L.A.'s Greatest Convention

THE dedication ceremonies of the new Atlantic City Auditorium held on Friday, May 31, and at which the principal speaker was the vice-president of the United States, opened the exhibition held in conjunction with the fifty-second convention of the Association. From this time until the following Friday when the convention closed with the election of Matthew S. Sloan as president of the Association for the ensuing year, Atlantic City was host to the greatest gathering of public utility representatives ever held in America.

All expectations for the convention were more than justified, President Arkwright and the members of the several committees responsible for the functioning of the convention and exhibition were assured both by the declaration and the attitude of the twelve thousand delegates and guests. The attendance even exceeded the liberal guess of Secretary of the Association Marshall when ordering convention badges, as it was necessary before the convention closed to issue to the delegates badges left over from previous years.

The convention would have been notable in and for itself alone, but the heart-moving tributes, both formal and spontaneous, paid to the Great Electrician made of it one that will ever be remembered as a golden page in the book of the industry's history by those fortunate enough to attend.

Like a musical theme, running through the whole convention was the voiced recognition of Mr. Edison as the founder of the present-day electrical industry, the recognition including, of course, as a theme must have an accompaniment, those who pioneered with him and those who, following in their footsteps, have aided in building the industry.

The colossal new auditorium proved ideal for the holding of a convention of the magnitude of this one.

OFFICERS
of the
ASSOCIATION
1929-1930

President, **M. S. SLOAN**
The New York Edison Co., New York, N. Y.

Vice-President, **W. A. JONES**
Henry L. Doherty & Co., New York, N. Y.

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Managing Director, **PAUL S. CLAPP**
National Electric Light Association, New York, N. Y.

Secretary, **A. JACKSON MARSHALL**
National Electric Light Association, New York, N. Y.

At night the beautiful and fantastic lighting of buildings, streets, boardwalk, beach and sky produced a picture that seemed a combination of the Aurora Borealis and an artist's dream.

The business sessions, at which were discussed the subjects of most immediate interest to the industry, and which will be recorded in some detail later, were exceptionally well attended, every session attracting a crowded house.

The exhibition, with displays by more than 200 manufacturers of electrical apparatus and equipment, was considerably larger than any previous one and attracted much attention from all delegates.

The carnival spirit manifest in the entertainment periods showed plainly that these features were thoroughly enjoyed. Professional entertainers, including Frieda Hempel, Albert Spaulding, Helen Morgan, Julia Sanderson, Frank Crummit, and, throughout the convention, B. A. Rolfe and his orchestra, afforded delight to lovers of music and song.

The reception and ball given Monday night, June 3, in honor of President Arkwright was a glamorous scene of social festivity.

For the first time at any convention, talking moving pictures supplemented the normal program. Talkies made abroad under the direction of W. H. Onken, Jr., senior editor of the *Electrical World,* especially for this occasion were the subject of much favorable comment. A talking movie of the complete convention was filmed by the Fox Case Corporation and will be showing at N. E. L. A. Geographic Division conventions and elsewhere by the time this issue of the BULLETIN reaches the reader.

Business sessions were simplified considerably over previous conventions. The general adoption by all Sections of the Association of serial reports of their activities, which appear throughout the year, eliminated the necessity of committee reports at the convention. The time heretofore given over to such reports was filled by speakers of leadership in many fields. Some of the addresses and reports made at the convention are reproduced in full in this issue. Others will appear in the next and succeeding issues.

First General Session

IN opening the first general session the morning of June 4, Preston S. Arkwright, president of the association, struck the keynote of the convention when he urged that all in the electric light and power industry accept Mr. Edison's example of patience, persistence and whole-hearted devotion to an idea as the ideal of what the industry should strive for in its dealings with the public. He urged even greater cooperation toward the solution of common problems than there has been in the past, to the end that the United States may continue to lead the world in the production and use of electrical energy. He pointed out that this nation produces and uses as much electrical energy as all the other nations in the world; that the rate of extension of electrification in this country is continuously accelerating, and that the potential market ahead is many times greater than that already developed.

Mr. Arkwright urged tolerance, but firmness of purpose, in dealing with critics; careful introspection as to motives and methods of development, and then aggressive progression along lines determined to be right and for the best interests of the public and the investors in the industry, and concentration of effort of the best minds of the industry in solving some of the present problems confronting the industry, followed by united expenditure of energy in carrying out decisions reached.

The financial affairs of the Association were discussed by Treasurer P. S. Young, who reported everything in excellent condition.

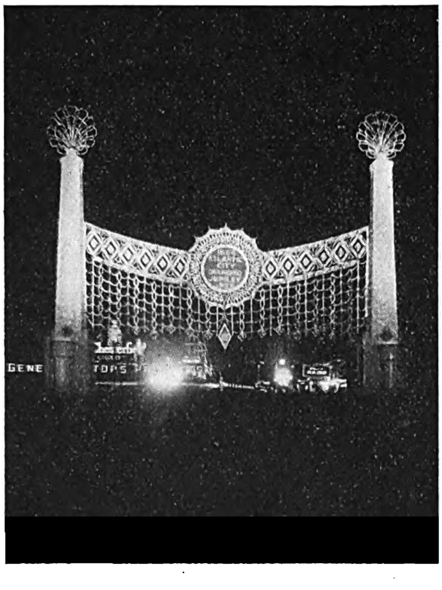
Referring to the year's progress in the electrical industry, Paul S. Clapp, managing director of the Association, said that energy used in the home has increased 15 per cent. More than a million new users were enrolled during the year. There has been an increase of 7 per cent during the period in the energy consumed by the average user, Mr. Clapp asserted, but incidentally the average amount paid has increased only 3 per cent.

With regard to the Federal Trade Commission investigation, Mr. Clapp said:

"During the year the National Electric Light Association has been under intensive federal investigation. In accordance with the policy indicated by the officers of the Association, our attitude has been one of complete cooperation with the government. Various representatives of the Federal Trade Commission have made repeated visits of varying lengths to our headquarters offices. All accounts reaching back ten years have been scrutinized in detail several times. Each voucher has been critically reviewed. Indices of the complete files were furnished and investigators were given prompt and complete access to every file requested. Requests for specific information and voluminous copies of material were complied with. Members of the staff have testified in Washington frankly, completely and often."

J. F. Owens, chairman of the Public Relations National Section, spoke of the Federal Trade Commission investigation and the newspaper discussion and editorial comment on the activities of some of the committees of the section.

In concluding his report, Mr. Owens said: "The accomplishments of the past are but an index to what the accomplishments of the future may be. Our industry will continue to be a constructive force in the life of the nation only as we deserve it. It will be stable only as we are right. Being right, as I believe the industry is, as nearly as it is possible for any human agency to be right, let us not hesitate to continue to give to those for whom we are trustees of a very important service, an account of our stewardship. Let us continue to fight for what we believe to be in the best interest of the American people. Let us not stoop to pettiness. Let us not sully our great industry by deeds that will not bear the searching light of day. The record of our accomplishments reveals the contribution to society and the race to be too valuable to need anything but straightfordwardness to insure lasting prosperity of the electrical industry."



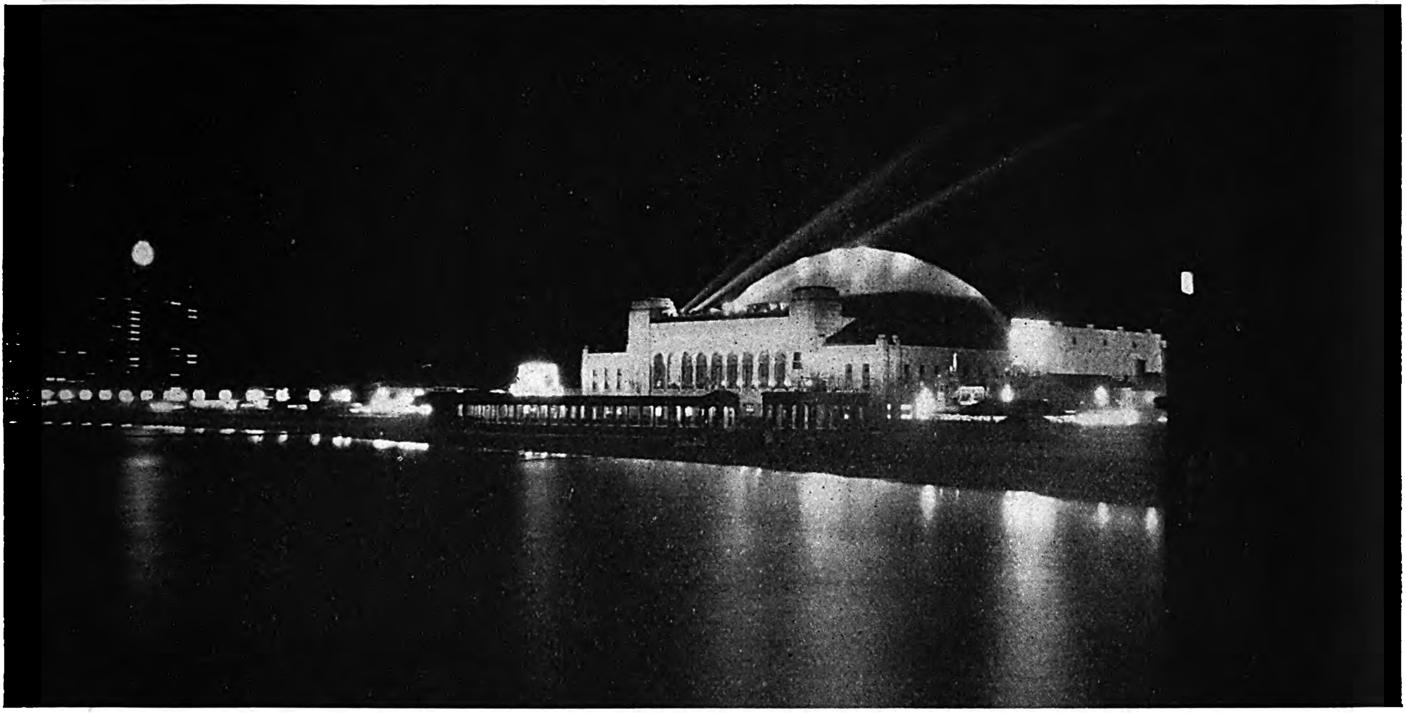
A most interesting incident of the session was the appearance of a disguished Englishman—Sir Ernest Benn—through the medium of a talking movie taken at his country home near London. Sir Ernest is a noted economist and publisher and, as he could not be present at the convention in person, a sound motion picture film of his greetings to the National Electric Light Association was taken and sent to Atlantic City.

Discussing the public right as to electric rates, ex-Justice William L. Ransom, of New York City, urged revision downward of residential rates. He said that "there are signs of a growing public consciousness as to electric rates, their forms, and their economic consequences as limitations on the service which electrical energy may render," and voiced the opinion that "it is fitting that in this representative association of the industry an effort shall be made to perceive what the public has a right to expect as to the rates which it pays."

According to Judge Ransom, "it clearly appears that the present barrier to electricity's full service in the home and in industry lies in the forms of rates. If the present rate structure makes a home-owner pay an average of six or seven cents a kilowatt hour for a relatively small quantity of energy, whereas he would be glad to use a much larger quantity for a variety of labor-saving uses, for which he could afford to pay an average of three cents, the rate schedule must be seriously at fault, providing the company could well afford to supply him the larger quantity of energy at the price he could afford to pay."

Speaking on the subject of present-day sales policies of the light and power companies, A. W. Robertson, chairman of the board of the Westinghouse Electric and Manufacturing Company, said that the record of progress of the electrical industry is "one of the proudest to which any industry can point, and it explains why the nefarious propaganda of a few people has been unable to disturb the prosperity and steady growth of the power companies."

He emphasized the responsibilities of the industry to the American people and dealt with the importance of satisfactory electric appliances. These appliances, he insisted, must be economical, convenient, serviceable and fool-proof so that they may be used frequently and without danger. He concluded with a plea for only standard, high grade appliances, saying that the use of right appliances as against unreliable devices should be encouraged in every possible way.



A Gorgeous Spectacle—Atlantic City Auditorium Floodlighted for the Convention

Second General Session

TAKING as his subject "Sales Increase or Rate Increase?" Matthew S. Sloan, President of The New York Edison Company and President-elect of the National Electric Light Association, in an address before the Second General Session said that the light and power industry "is slowly being squeezed between the jaws of a pair of pincers."

One jaw is a decline in the kilowatt-hour sales and in revenue for each dollar of investment, and the other is a rising investment for each kilowatt of installed generating capacity.

Summarizing the situation Mr. Sloan asked the question: "Shall we increase our sales or our rates?", stating that this question is distinctly and sharply pertinent.

"The answer to this question is," he said, "that we must increase our sales. We must sell more kilowatt-hours for each dollar of investment, making our equipment work harder and steadier, and the place to sell more service, in my judgment is in the home."

This session was enlivened by the introduction of greetings from Europe through the medium of a talking movie—this time by His Excellency, Dr. Alberto Pirelli, of Milan, Italy, President of the International Chamber of Commerce.

The investment companies were championed by Marshall E. Sampsell of the Central Illinois Service Company, who said that without their assistance by the purchase of common stock and by the extension of general credit, as well as by management and engineering skill, many operating light and power companies could not keep pace with their rapidly expanding business.

Reporting on the electrification of railroads, Britton I. Budd, chairman of the committee on that subject, stated that there are twenty railroads having some degree of electric operation. The length of route electrified is 1900 miles, and that of all tracks, including yard and side tracks, 4300 miles. The three large electrifications now under way are the Pennsylvania, the Reading and the Lackawanna.

George Gibbs, consulting engineer, of New York, followed Mr. Budd. After reviewing the history of railroad electrification in this country, the progressive steps which are being taken by various railroads to develop heavy electric traction for all kinds of traffic, and the advantages now being secured by some roads by electrification in freight yards for shunting and classification purposes, he said:

"Electric haulage has been tried out for every condition met with on steam railways. It has demonstrated by years of trial that the present development and perfection of apparatus from the power house down to the propelling wheels of the train will produce reliable and useful results from an operating standpoint."

E. C. Stone, chairman of the Engineering National Section, reporting on the activities of the section, urged "more system capacity per dollar of investment." With fuel efficiency at its present high level the cost of generation has become almost a minor item, he said. Discussing the question of electrical hazards in the home, Mr. Stone said that considerable public attention had been called to them, probably because "while such accidents are very few, they are necessarily spectacular in nature when they do occur. Recent statistics of the National Safety Council indicate that the chance of a fatal accident in a home from a fall is sixteen times that from electricity."

P. B. Zimmerman, secretary of the National Food Preservation Council, spoke on the food preservation program. This program has for its objective four major ideas. These are the necessity for keeping food below a certain temperature, the relationship between food spoilage and health, the causes of food decay and bacteria growth, and the vital need for proper all-year-round refrigeration.

General J. J. Carty, vice-president of the American Telephone & Telegraph Company, addressed the session on "Science and Progress in the Industries." He pointed out that the American progress was linked with research and said that "one of the outstanding factors in the success of the light and power industry is its encouragement and support of laboratories for research in applied science.

Third General Session

UNABLE to appear at the Convention, Thomas A. Edison delivered from his home near Fort Myers, Fla., a personal message to a throng that jammed every available inch of space in the mammoth ballroom of the Auditorium. This session was set aside on the program as "Edison Day." Mr. Edison appeared through the medium of a movietone film, which pictured him as strong, active and smiling, and which transmitted his message in a voice, firm and clear to delegates, members and guests of the National Electric Light Association.

John W. Lieb, vice-president and general manager of the New York Edison Company, presided as Honorary Chairman and paid a touching tribute to Mr. Edison. Henry Ford, whose friendship for Mr. Edison has inspired him to a keen personal interest in the collection of electrical apparatus for the Ford Museum of Americana at Dearborn, Mich., and the reproduction there of Menlo Park, the scene of Mr. Edison's work with the incandescent lamp, was introduced at this session by E. Wilbur Rice, honorary chairman of the General Electric Company. Mr. Ford spoke a few words of thanks in appreciation of the applause that greeted his appearance.

Summing up the record of the electrical industry, Thomas N. McCarter, President of the Public Service Corporation of New Jersey, said that "it was conceived and has been developed as a private undertaking. Without the initiative, without the enterprise that comes with private as opposed to Government operation," he continued, "it would never have reached its present stage of usefulness. No Government would, or should, have taken the risks, have incurred the expenses, have suffered the losses, that were necessary to its growth and expansion.

"Nor has the time yet come, nor is it in sight, when the industry can successfully function without the same application of initiative and enterprise to its affairs."

Designating him as New Jersey's most illustrious citizen, Mr. McCarter, after listing a few of the many major industries in which his inventions have played an important part, such as telegraphy, telephony, wireless, radio, motion picture, electric rail transportation and electric light and power, paid a remarkable tribute to Mr. Edison.

Taking as his subject "The Inspiration of a Name," Charles L. Edgar, President of the Edison Electric Illuminating Company of Boston, and one of the early associates of Mr. Edison, told the audience that the illustrious personages whose names have illuminated the pages of history can be classified into two groups.

In the first group he placed such names as Washington and Lincoln—men who have dedicated themselves to the preservation and upbuilding of their country. In the second group he placed those "who have risen to fame through accomplishments which were the result of a thought or an idea originating in each inner consciousness." These he said were "pure individualists who assumed their tasks, not in response to a popular demand for a leader to accomplish some desired result, but inspired only by their own visions."

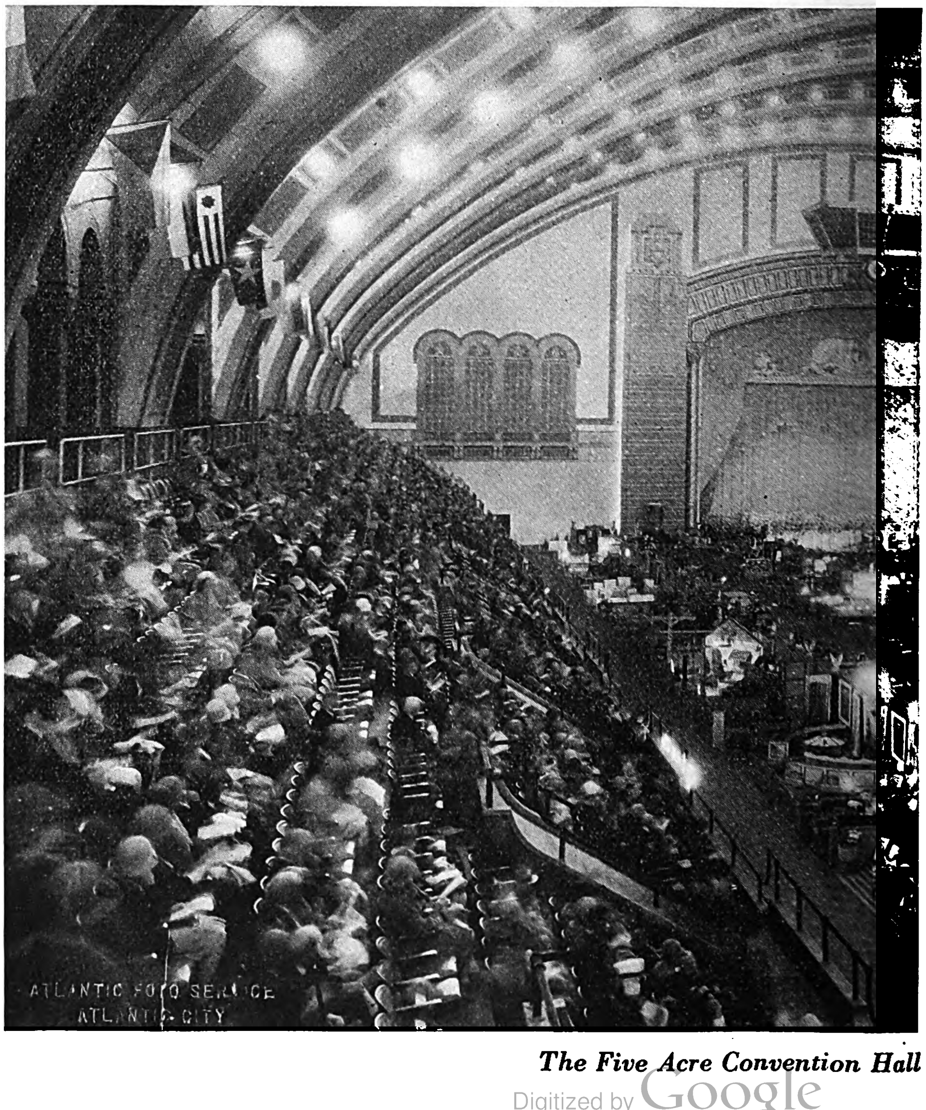
Turning to Mr. Edison as the outstanding personage of this second group, Mr. Edgar said: "It remained for Edison to discover the source from which at his magic touch was created a new sun for a new world, dispelling darkness and bringing added comfort into the homes and revolutionizing the life and methods of a grateful world. For him nature revealed her hidden secrets and through him a new industry sprang into being. After centuries of unconscious waiting the world awoke to realize that the dark watches of the night had wasted away and a new day of light and gladness had dawned for mankind."

Another feature of the program was the presence of Elmer A. Sperry, President of the American Society of Mechanical Engineers, a leading spirit in the organization of the National Electric Light Association in 1885. Mr. Sperry spoke on "The Birth of the Industry," describing the organization of the Association, the many difficulties of the industry during its early days, and the arc light, which was the only form of electric lighting prior to the invention of a practical incandescent lamp and Mr. Edison's system for generating and distributing electricity.

The concluding address of the session, delivered by Berton Braley, the well known author, can only be described as a classic among efforts to express appreciation of an individual and his work.

Taking as his subject "The Lamp of Aladdin," Berton Braley said, "where the slave of Aladdin's lamp might move a palace a thousand miles, the slaves of Edison's lamp have moved civilization forward a thousand years. Where the slave of Aladdin's lamp could heap a horde of gold and jewels before Aladdin's wondering eyes, the slaves of Edison's lamp have created new wealth beyond the wildest dreams of Oriental magnificence, and made of the very earth itself a vast jewel coruscating with multi-colored radiance."

The quest for the Golden Fleece was a mere jaunt by comparison to the search for a fibre that would glow and con-



The Five Acre Convention Hall

tinue to glow after it had burned, according to Mr. Braley. "Finding a needle in a haystack was as easy as finding Cleopatra's needle in Central Park when put beside this job of discovering the fibre for the incandescent lamp," he said.

At the conclusion of his address Mr. Braley said: "Fifty years ago Thomas Aladdin Edison rubbed a lamp and the electrical industry as we know it now was born. Its social, material, industrial and spiritual ramifications, the historian of 3,000 A. D. may possibly be able to estimate, but we cannot. We can count—by mathematics such as only an Einstein might understand — the physical wealth that hangs by the burnt fibre in a vacuum, but even with the aid of calculating machines that think and ledgers that talk, we are probably shy several billions of dollars. Of the other values created by the lamp of Aladdin we can have no approximation. We are in the realm of the Infinite, where the 'blindest bluffs hold good, dear lass, and the wildest tales are true!'

"Let the Bards turn to yesterday for Romance, we know she is with us today and leading us into the bright and brave promise of tomorrow. We recognize her not only when she flashes across the sky with the air-mail, but when she perches in the grimy cab of the coal dumper beside the sooty-faced operator whose levers do the work of a thousand sweating men. She rides on the radio waves, and she runs the washing machine. Her glamor is no less now that she has gone to work than when she sang songs among the sirens as Ulysses passed, bound to his mast. And where once only a few adventurers might follow her fleeting footsteps, the Lamp of Aladdin lights her trail for us all."

Fourth General Session

ONE of the outstanding addresses on Friday at the fourth general session was delivered by John L. Madden, vice-president of the Metropolitan Life Insurance Company. The subject was "Industrial Development in the United States," and it dealt with the results of a field survey conducted in cooperation with the civic development committee.

According to Mr. Madden, "the real industrial development came from new industries started within the communities themselves," the migration of industry being relegated to a much smaller role in economic growth than was expected. Relocations accounted for only 9.4 per cent of the plants gained by the various communities. New industries accounted for 81.8 per cent of the plants gained, while branch plants accounted for the remainder of 8.8 per cent.

During the period surveyed, 5908 plants were lost to American cities. About 18 per cent of these moved away, while the remaining 82 per cent went out of business. The total number of plants lost was about 60 per cent of plants gained.

Arbitrarily taking a population of 50,000 as a dividing line between larger and smaller cities, Mr. Madden said that "we find that the branches and relocations were divided nearly equally between these two types of cities, but that approximately three-fourths of the local plants were established in the larger cities. All types established in the larger cities accounted for 58.4 per cent of the total gains in employment reported in the survey."

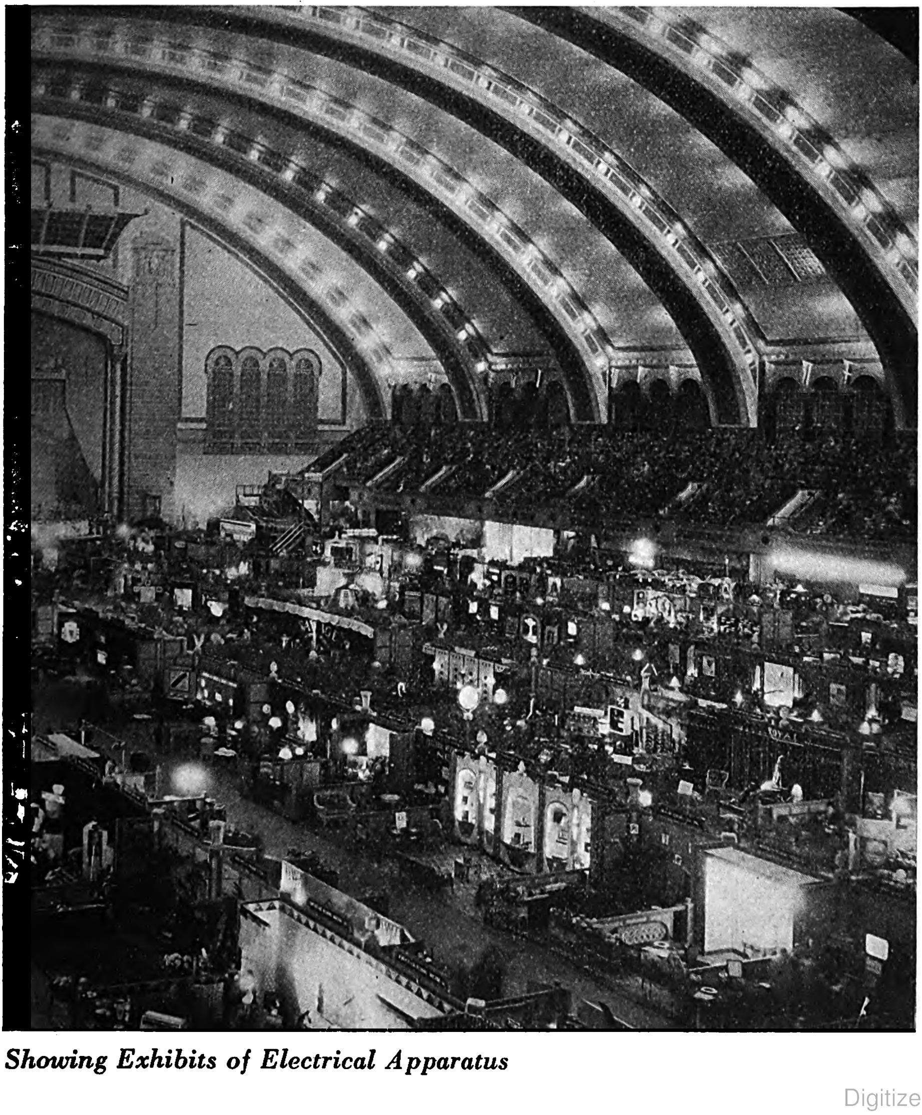
The larger cities of 50,000 population and over received 54 per cent of the plants employing 100 or more workers, whereas the smaller cities received the remaining 46 per cent of these larger plants, more than one-half of which are in cities of less than 10,000 population.

Discussing the reasons underlying the location of plants, Mr. Madden said that "markets are advanced most frequently as the reason for location of plants. The business man," he continued, "who has tuned in his sales practices to the high demand of his consumers is naturally going to consider the location of new plants in relation to his marketing program."

J. F. Ford, chairman of the Accounting National Section, reported on the activities of this section. He dwelt on the effective development of accounting methods and traced the trends that are leading the accountants toward a broad and very fundamental functional position in the industry. The scope of their work calls for a complete business man, and they cooperate with those in charge of all departments.

Sir Kengo Mori of Tokyo, Japan, paid tribute to the genius of Thomas A. Edison and his electric incandescent lamp through a "movietone" film. One thought expressed by him was: "An invention whose advantages can be enjoyed by only one section of the community, or the people of only one country, cannot be termed a true blessing. But the electric lamp is a true blessing in the sense that its beneficence extends to every man, every woman, the world over."

"The cost of producing and distribut-



Showing Exhibits of Electrical Apparatus ing electrical energy has been greatly reduced," said William J. Hagenah, vice-president of the Byllesby Engineering and Management Corporation, in his address on "Regulation." The reasons for the lower costs, he explained have been the remarkable progress made in the electrical industry by the building of vastly larger and more efficient units of production, the greater productivity of labor per unit of effort, the interconnection of utilities and the increased economy of operation and efficiency of management made possible by the holding company and the management company.

"The great savings," he continued, "that have resulted from inventions, improvements in technical processes and efficiency in management have been transmitted to the public through the constant downward revision of rates. The profits have not been retained by the utilities, for at no time have the state regulatory commissions permitted rates that yielded an unreasonable return on the fair value of the properties. The influence of the state commissions has always been present, both in formal and informal negotiations, carrying out the spirit of the utility laws. Every saving by the utilities, almost as soon as it was accomplished, has been passed on through lower rates to the customers for service. During this same period private industry, limited only, by the restraints of competitive business, not only advanced prices violently, but has generally maintained them at a level far in excess of pre-war prices."

Another speaker at this meeting was J. R. Howard, past president American Farm Bureau Federation, who dwelt on the progress and problems of rural electrification. He urged progress and pointed out the national importance of this work. B. F. Weadock, special counsel, reported on his work with the Federal Trade Commission, and W. H. Onken, Jr., senior editor *Electrical World,* presented the memorial address.

The Convention formally closed with the election of Matthew S. Sloan as President for the ensuing administrative year, and Edwin Gruhl of the North American Company as Vice-president.

National Sections and Public Policy Sessions

Public Policy Session

FEATURED by an address by Julius H. Barnes, Chairman of the Board of the U. S. Chamber of Commerce, the public policy session held on the night of June 6, filled to overflowing the great ballroom of the Atlantic City Auditorium.

The Charles A. Coffin award was also made on this occasion and the report of the Public Policy Committee, delivered by W. W. Freeman, vice-chairman of the Committee. Interspersed in the program were recitals by Albert Spalding, violinist and Freda Hempel, soprano of the Metropolitan Grand Opera Company and music by B. A. Rolfe and orchestra.

The inspiring report of the public policy committee contained the fundamental doctrines that have made the industry and laid the planks of its future platform. The able address of Julius H. Barnes, chairman of the board of the United States Chamber of Commerce, gave a picture of all industry and oriented the light and power group in the perspective possible only to a man with the vision and experience of Mr. Barnes.

Mr. Barnes said in part, "Within the past month, the Committee on Recent Economic Changes, under the chairmanship also of Herbert Hoover, recounts the progress of the five intervening years. This report speaks of the rise in the use of power, three and three-quarters time faster than the growth in population. It emphasizes its increasing flexibility which enables it to penetrate every section of the United States, including rural areas. It speaks of the silent revolution by which through power the unskilled worker has become a skilled operator, multiplying his effectiveness. The survey states that, as a nation we now use as much electrical energy as all the rest of the world combined.

"Inevitably we must analyze for ourselves the causes which lie behind preeminence in national progress. There is, then, not disparagement, but inspiration, for ourselves and others, when we find cause and effect securely joined.

"For example, the sixty million horsepower today in America is possible because today seventy-five per cent of America's factories are electrified, while in Great Britain only forty-eight per cent are electrified. With that we find that the relative national wealth of United States and Great Britain runs in exact ratio of the horse-power per capita used in industry, namely 4½ to 1. With that, again, we find as between the United States and Great Britain, we have twice as many owned homes, and one-twentieth as many people per capita on public charity.

"The indicators by which our national income rises in throbbing growth until it approaches an annual one hundred billion dollars of new production, show that American industry, with its power service, increases the volume of things to divide among the homes of America. The evidence in America of equable distribution of these earnings under our political and social system rests on such indicators as its twenty-five million automobiles and its nineteen million telephones. Distinctly, the average of human security is steadily advancing. The congested quarters of our cities today show the universal possession of good shoes and stockings by the children of the tenements. The wage-earner of America today may reasonably aspire to own his flivver and a savings account. The working-girl of America has established the standard of silk as the proper garb for self-supporting womanhood. The poorhouse is today echoing fewer footsteps within its sparsely tenanted halls.

"America's most significant gift to civilization will be by history rated its genius for revolutionary organization of industry. America's title of honor in history will rest upon the rise of average welfare under the earnings of highly organized and power-driven industry, and of a social system which distributes and shares those earnings fairly."

The program was broadcast by more than a score of stations associated with the National Broadcasting Company.

In making the presentation of the Charles A. Coffin medal to the El Paso Electric Company, President S. Arkwright, President of the Association, said of the company: "Despite its comparatively small size, the many limitations and difficulties surrounding its growth, this company has grown, has prospered and has played a part which your commitee feels constitutes a distinguished contribution to the development of light and power for the convenience of the public and the benefit of the industry. The committee hopes this award will be an inspiration to the managers of the smaller companies operating throughout the nation.

"In every field, general administration, commercial activity and engineering, a splendid job has been done by an active, aggressive management. I think it is no exaggeration to say that the fact that this company with notable resolution and tenacity has submitted statements of its accomplishments, has in no small measure helped in making its fine record in all fields."

F. J. Gannon, manager of the El Paso

Electric Company, received the award on behalf of his company.

The report of the Public Policy Commitee was read by W. W. Freeman. It stressed the development of the industry by following sound public service policies. Mr. Freeman declared, "The electrical industry has been progressive; it has not stood still. From the beginning the men responsible for electrical development have realized the enormous contributions in useful service that electricity has made and will continue to make to the whole national and community welfare, to workers and to homes, to all phases of economic and social life. They understand and assume the obligation to unfold the full possibilities of electric service and translate them into everyday use."

The report dwelt on the constructive policy of rural electrification, the policy of economical system building, of rate reductions when justified and other matters of long-tried effectiveness. It told of the co-operative attitude taken by the utilities in the Federal Trade Commission investigation and looked for the result unafraid.

Accounting Session

STATING that the newspapers today are filled with "criticisms and suspicions, and a certain amount of fear, that the electric light and power companies have become a species of diabolical octopus, which will get out of control and choke the very life of the nation," Professor Deane W. Malott, assistant dean of the Harvard Graduate School of Business Administration, in an address on "The Professional Motive in Public Utility Management" before the Accounting National Section expressed the opinion that "it seems unlikely that an industry of such size could have arisen with these as the dominating motives."

Continuing along these lines, he said: "Largely, the development of public utilities has been through the corporation a type of organization which, contrary to popular conception, inevitably tends to higher ethical standards, with more of a feeling of trusteeship for the public which it serves as well as for the employee, and the security holder. The big corporation stands for stability and permanence, rather than for rapid and immediate profits. It is easy for one man, in a little shop around the corner, to engage in sharp practices. It is far different in a corporation where the individual executive is surrounded by associates whose respect and trust are necessary to his existence. For these corporations are no longer controlled by a few men, nor by bankers. The ownership shares are scattered throughout the land, just like automobiles or electric lights."

Describing the public utility laws to which the electrical industry is subject, and stressing the fact that unit cost decreases as volume increases, the speaker warned against any attempt "to collect a monopoly profit which results in a high unit price on a restricted output, because your aggregate profit will be greater if your prices are cut to the limit." He believes that once the economic concepts are clearly understood "the barrier wall between the utilities and the public largely disappears."

Describing the accounting department of a public utility as "the only recording channel of all its activities" and as "the steering wheel which guides the executive in his constructive thinking," J. F. Ford, chairman of the section, said that the Accounting Section must be alert and on its toes continually to meet the constantly changing conditions in the march of progress of the industry.

According to Mr. Ford, the accountant today stands in quite a different light than he has in the past. He "tells you where we have been, where we are now and where we are going. The accountants are the compass for executives to steer their course toward the harbor of successful and financial results."

W. Alton Jones, first vice-president of the Cities Service Company, told the audience that according to old documents, recently discovered in Genoa, it cost Columbus $6,000 to discover America and raised the question as to whether or not it was worth it. He did not suggest that the Accounting Section settle the matter, but pointed out the historical interest to the fact that 500 years ago accountants were employed and careful records kept of business undertakings.

Discussing the investigation of the light and power business now being conducted by the Federal Trade Commission, Mr. Jones said that in his opinion, "there is confronting the accountants of this industry the grave responsibility of seeing to it that in the course of this federal investigation such facts as are required of us be presented in such a manner as not to lead to hasty or improper conclusions on the part of those who will be called upon to consider them and who may be less familiar with our business than they should be."

In conclusion, he said: "I am of the opinion that there is enough factual information available to prove to almost any open-minded American citizen that the government should keep out of all lines of business, but I am equally certain that far too little real factual information about this subject is being presented to the American public."

David Lawrence, president of the *United States Daily*, addressed the session on the subject of "The Trend of the Times."

Commercial Session

THE commercial opportunity now before the electrical industry and the necessity for taking immediate action to increase sales were subjects stressed by one speaker after another during the Commercial Section session of Wednesday afternoon, at which Chairman Marshall E. Sampsell presided. In opening the session Mr. Sampsell stated with emphasis that without the assistance of the investment companies, by the purchase of common stock and by the extension of general credit as well as by management and engineering skill, many operating light and power companies could not keep pace with their rapidly expanding business.

T. O. Kennedy, chairman of the Lighting Bureau, reviewed the several campaigns carried out during the year and declared that millions of customers are not now making use of the lighting facilities afforded them.

V. M. F. Tallman, chairman of the Power Bureau, called for commercial action, but testified to the strenuous competition which electric power and electric heating are experiencing from internal-combustion engines and commercial fuels. He said in these fields it is now sometimes harder to hold old business than to secure new business. He urged careful study of the customer's problem by the man who undertakes a selling job.

Frank D. Pembleton, chairman of the Merchandising Bureau, reviewed the work done by the committees on refrigeration, electric water heating, the electric range and domestic uses of electricity. Mr. Pembleton urged setting up a style or "craze" for electrical appliances, similar to that now manifesting itself for radio or for color in bathrooms and kitchens. With such a fad movement, aided by intensive advertising, Mr. Pembleton predicted that last year's appliance sales of $750,000,000 could be within five years doubled annually.

P. M. Zimmerman, secretary of the National Food Preservation Council, described the September campaign to awaken public understanding to the food spoilage that takes place at temperature above 50 deg. Fahr. and showed how electric refrigeration could be financed out of food wastes in the average family food budget.

Gerard Swope, president of the General Electric Company, declared that the whole theory of central station commercial operation was admirably stated in the convention papers by Messrs. Sampsell and Sloan. The only thing that remains, said he, is for the industry to go to work and "play the game." An average residential consumption of only 456 kw-hr. is an indictment of the central station industry. Mr. Swope emphasized three factors, education of the public, price of merchandise and cooperation with the trade, as the three essentials to future commercial progress.

Martin J. Insull, president Middle West Utilities Company, urged diversification in the sale of power and predicted the increased importance of the commercial staff in the future as it comes to study its economic responsibilities.

C. E. Groesbeck, executive vice-president Electric Bond and Share Company, declared that it is the commercial department which makes the rest of the utility business go. He commented on the 280 per cent growth in the industry's output during the past decade, which has been obtained from 69 per cent increase in the number of customers. The residence load is the backbone of the business, he declared, and is one that can be increased with the least additional investment.

W. W. Freeman, president Society of Electrical Development, described the plans of the Industry Sales Conference and said that a complete program will soon be made public. America offers a huge undeveloped market for wiring, appliances and electrical service, and all experience has shown that sales are proportional to advertising effort expended.

Earl E. Whitehorne, McGraw-Hill publications, presented the prizes in the N. E. L. A. residential kilowatt-hour contest. Checks for $2,000 each were awarded to companies at Cheney, Wash.; Birmingham, Ala., and San Antonio, Tex., for respective increases as follows: 491 kw-hr. to 686 kw-hr.; 433 kw-hr. to 496 kw-hr., and 256 kw-hr. to 415 kw-hr. Second prize checks of $1,000 each went to properties at Fresno, Cal.; Scottsbluff, Neb., and Beaumont, Tex. Honorable mention was awarded to Portland, Ore.; Durham, N. C.; Pueblo, Colo., and Annapolis, Md.

The Federal Electric Company $1,000 award for electrical advertising went to the Edison Electric Illuminating Company of Boston.

Engineering Session

APPROACHING the public utility business as a science, A. C. Marshall, vice-president and general manager of the Detroit Edison Company, speaking before the Engineering Session, said that the successful business man is a scientist whether he knows it or not. As an example, he suggested that there wouldn't be any suspender business if it were not for the law of gravitation.

Taking up the question of total investment per dollar of earnings in the light and power business, Mr. Marshall said that in water power systems this will be higher than where steam-generated power is used. He pointed out that there are developments in the industry tending to increase the investment per dollar of earnings. Among these are: the necessity for replacing poles and overhead wires with underground cables in greater and greater areas; cost of better and more ornamental substations; the increasing necessity for reliability of service; the trend in industry toward replacing man-power with mechanical power; the large capacity of interconnected systems, increasing the duty of all equipment; and the constant striving after higher steam pressures and temperatures.

E. C. Stone, president of the Duquesne Light Company and chairman of the section, emphasized the fact that electric light and power companies in the United States have made such continued progress in fuel efficiency during the last few years that the problems involved in system investment now offer the greatest field of opportunity for further major economies.

Mr. Hoover, on the grounds of specialized education, "is the first real engineer president of our country," in spite of the fact that "George Washington gained an unmistakable renown as an engineer," according to F. R. Phillips, vice-president and general manager of the Philadelphia Company, Pittsburgh, who addressed the session on "Engineers and Engineers."

Summing up, Mr. Phillips said: "The type of engineer for whom there will always be a crying need, must be more than a technician and must be able to more than design and construct; he must be a manager, well versed in economics, finance and public affairs, possessing a sympathetic understanding, a leader, dominated by a desire to promote the public welfare, in order to bring successful results not only out of his own vision, but out of the vision of others so that the dreams and aspirations of mankind may come true. Therefore, the keynote of our present era is the coordination of human effort for the good of all, in which the engineer may play a commanding part."

Speaking on the subject of "Practical and Economic Aspects of Standardization," L. L. Elden of The Edison Electric Illuminating Company of Boston, said that "even the humble cow must provide milk conforming to prescribed standards or she is taboo. In most standardization work," he continued, "it is difficult to distinguish between simplification and standardization, yet in the end it is a combinaton of both, coupled with methods for eliminating waste, that prove to be fundamental factors underlying the success of most undertakings."

He concluded by saying that "standards may be nothing to enthuse over, yet there is a definite measure of satisfaction in viewing past accomplishments in the standardization field. It is apparent on every hand that this work has already contributed to the welfare of the ultimate consumer and the public at large in such liberal measure as to warrant recommendations for continued support and prosecution of standardizing activities on behalf of the electric industry."

Public Relations Session

ADDRESSES by J. F. Owens, chairman of the Section; John F. Gilchrist, vice-president of the Commonwealth Edison Company; Miss Lita Bane, past president American Home Economics Association, and B. C. Forbes, editor of *Forbes Magazine,* were the features of the Public Relations Session held Thursday afternoon, June 6.

Personal obligations of the men and women of the industry formed the topic of an inspiring address by John F. Gilchrist entitled "Superhumans for Better Institutions."

He pointed out that the electrical industry was one that gives one man the producing power of scores of men of only a few generations past, that spreads the noonday light over the hours of darkness, that for a trifle provides the poor of today with relief from grinding labor and with comforts and conveniences, life lengtheners, which the money of the rich could not buy in the days of our grandparents. Speaking more directly, he said:

"Upon you rests the responsibility for the proper development of a great fundamental industry, possibly to become the greatest of all industries and the one to which more than to any other the people of our country and the world will be indebted for the greatest measure of human life and happiness.

"Looking to the future, the greatest need of this industry is for men and women, or, might I say, for superior men and women, superior in mental and physical vigor, superior in common sense, superior in general and special education, trained young people with an intimate knowledge of the present-day conditions in the business in which they expect to embark, so that on embarking there shall be the least time lost in finding themselves."

Mr. Gilchrist then developed ways and means and methods of cooperation whereby men and women within the industry and in educational institutions could be trained to meet the demands of the future. He concluded that much can be done to provide for the future if all concerned will cooperate and make the best use of the knowledge now available. If the student, anxious to prepare himself for a useful and effective life, the educator devoting his education and culture to the turning out of a well developed, well educated and practical human product and the executive in the electrical industry who is in a postion to have the best vision of what is required, will work together on this prob-

(*Continued on page 365*)

The President's Address

By Preston S. Arkwright

President, National Electric Light Association

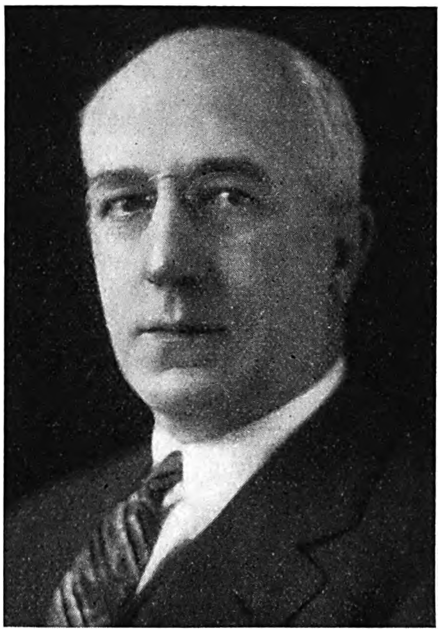
Made June 4, 1929, at the Opening Session of the 52nd Convention of the Association

YOU have honored me to serve you during the year as President of the National Electric Light Association. I have had opportunity to more fully evaluate the work of the Association and to measure the contributions it makes to advancement in electrical progress. In spite of the apparent needlessness of saying it, yet I would like to emphasize that the National Electric Light Association is a voluntary association of separate, independent units. It does not operate, control, manage, construct, finance, or share in the ownership of any electric light or power company. Nor has it any power or authority of direction, control, censorship or veto over the acts, conduct, or utterances of any member of the Association. Its function is to accelerate, stimulate, and coordinate effort in electrical progress. The objective of the Association is "to advance the art and science of the production, distribution and use of electrical energy for public service." This objective is followed with vigor and certainty of purpose. Through the Association, the most advanced ideas, drawn from the practical field of experience of member companies in engineering, accounting, business methods and all the various aspects making up the business, are discovered and diffused.

The company members are not in direct competition with each other in the same field. Therefore, there cannot be and there is not any effort to fix prices of the product or to curtail production. There are no trade secrets between the utilities. On the contrary, the originator of a new idea or improvement finds recognition for his contribution by making it known to his co-workers through the Association.

The Result of Cooperation

The sum total of best abilities, and best minds, within the utilities is made available to member companies, large and small, in all sections of the country. Without the Association, improvements found by one company would be isolated there; through the Association, they find acceptance and prompt application throughout the entire country. Each company thus benefits from the progress of the others and the public generally obtains the benefits of a progressive improved electric service.



PRESTON S. ARKWRIGHT

Of the recent forces in the economic structure of the nation, none has been more fundamental in advancing the living standards than mass production. Mass production of electric power is outstanding among these. We call it interconnection. I refer to the creation of these great interconnected electrical systems concentrating major power production in large efficient power houses, then diffusing and subdividing this power as required for smallest or largest user, in city or hamlet, in the home, the factory, or on the farm. Our engineers, through the medium of the Association, years ago formulated and secured wide acceptance of standard voltages, frequencies, and operating practices thereby laying the essential background which made possible the interconnection of adjacent power systems. The Association rightfully deserves much credit for the rapidity and soundness with which the benefits of this far-reaching advance in power development have been brought to the American people.

There is today available in practically every quarter of the United States abundant and reliable supply of central station electric power at prices competing so successfully with the cost of power from other sources that the public often assumes that the utility companies have a complete monopoly of power supply. The total increase in power capacity in the nation's factories, mines and quarries since 1919, amounting to 9½ million horsepower, has been in electric motors. These industries had opened to them alternative power sources which they could themselves locally install. This growing reliance of the country's manufacture and mining upon electric utilities for their added power supplies is convincing evidence of the remarkable performance of these companies in provision of low-cost, reliable power deliverable at almost any point in any quantity desired.

The accomplishment of the almost revolutionary changes in the engineering, operating and economic characteristics of electric power supply concurrently with need for large expansion in facilities, has thrown an enormous burden of work on our engineers. The best engineering policy and experience within the industry is engaged in interchanging ideas, compiling authoritative information and making this available to every company. Each company benefits from the judgment and experience of engineering talent which in the aggregate but few could singly afford to engage.

Advances in Power Production

The major advances in the art of power production from the beginnings of the electrical industry have come through that industry. Without these inventions and improvements, there could have been no large scale substitution of mechanical for hand labor. Let me briefly summarize these advances: The reciprocating engine was developed to its maximum size and efficiency; the steam turbine, known to Nero in 100 B. C., remained impractical until its combination with the high-speed electric generator and is the major development in steam utilization in the last half century and now the world's principle prime-mover; hydro turbines and the whole conception of hydroelectric development have reached their furthest advance in the utilities. Running through all this path of progress may be found the work of the National Electric Light Association and its members in constant stimulation and diffusion of information on best practice.

The trend is toward larger and more efficient units for power production. Size of turbine and generating units has increased in ten years from 40,000 kilowatts to 108,000 kilowatts. Single power houses are under construction to house 1,000,000 horsepower. These huge power stations—the hearts of the electrical systems—are outstanding marvels of engineering accomplishment. Average quantity of fuel burned per kilowatt-hour in 1919 was 3.2 pounds. Continued improvement in power house design and operation pushed this average consumption per kilowatt-hour to 1.76 pounds for 1928. The aggregate saving due to gains in efficiencies since 1919 amounts to 180 million tons.

Toward More Economical Generation and Transmission

The Association is directing aggressive attention to transmission and distribution, design, construction methods, operating and maintenance practice, and safety rules, in both overhead and underground systems. High voltage cables are under experimental research. Ways are being sought to more economically transmit the increased quantities of power in both overhead wires and underground cables, in spite of conditions increasingly difficult due to congestion. Marking and lighting of power structures within airways, power line crossings over railroads, coordination of the operation of our service with telephone, telegraph, train control, and radio—all involving important relations with other public service—are enlisting your Association's consideration.

Our engineers have focused particular attention toward sound, advance planning of whole electrical systems, anticipating future requirements of the communities served and visualizing the step-by-step placement of power houses and transmission structures to adequately meet the power requirements of each locality at minimum cost. Because of this system planning, electric power facilities, taking the country as a whole, are located and constructed for maximum utilization, most economic operation, and without wasteful duplication.

Research

Your Association, in behalf of its members, at the convention last year, announced its participation along with other industries in the plans of the Pure Science Research Fund for a program in pure science research in the colleges and universities during the next ten years. Provision for our participation was made through increased dues and the Association is now prepared to take its part in this movement as soon as plans are finally formulated by the National Research Council and the National Academy of Sciences.

There has been fuller cooperation between the various branches of the electrical industry in meeting common problems of electric development. There has been decided progress in better understanding between the manufacturer, the contractor-dealer, and all merchandisers of electrical equipment. Our visualization of the contributing factors in electrical development is expanding to properly embrace the whole group of some 700,000 men and women engaged in research, design, manufacture, construction, installation, management, operation, and financing of this great development. The fine work of the National Electrical Manufacturers Association, the Association of Electragists, International, and the Society for Electrical Development and their cooperation with the National Electric Light Association have been contributing factors to this enlarged mutual understanding and direction of common effort toward fuller electrical development.

Accident Prevention

The Association from its beginnings has continuously prepared and diffused information on safe methods of operation, improvements in design for safety, instruction in methods of resuscitation from shock—all designed to safeguard both life and property. As a result of the Association's stimulus, thousands of executives and employees of the companies each year receive instruction. Savings in property loss and from reduction of time loss resulting from accidents are extremely large. A direct measure of the great human value of this useful endeavor is the award in seven years of Insull Medals to 264 persons for saving life.

Standardization

Most of us do not realize the enormous volume of work carried on by the Association in connection with standardization, simplification and codification. It is a decided factor in lowering cost and facility in use of electric service. There is scarcely a piece of equipment apparatus or material used in rendering the service which is not involved; it likewise relates directly to our customers. This work could not be accomplished by any company acting individually; it requires expression of industry viewpoint at over 200 points of contact with national and international standardizing groups. The savings attained to the companies in reduced costs of equipment, reduction of inventories and facility in repairs amounts to millions of dollars annually. Practical uniformity in character of electric supply for voltage and frequency has been attained; attachments for lamps and appliances are the same throughout the nation effecting large reductions in cost of electrical equipment purchased by the consumer, and adding enormously to convenience. Particular attention has been given this year to increased participation in this work and to strengthening industry representation.

Community Development

The electric utility company prospers only as the individual community prospers. Our investments in facilities are an integral part of the thousands of communities we serve. If business is better elsewhere, we cannot pick up and move. Recognizing this, the Association is assisting and urging its member companies to more actively participate in local community and state development. It develops information of value particularly to the small town in furthering industrial development.

Rural Service

Decided progress has been made in extension of electric service to farms, an increase of 30 per cent being credited to this year, which brings the total served to 500,000. It is perhaps the most significant accomplishment of the year. It is only well started. The National Electric Light Association has sponsored and stimulated this endeavor. In 1923 it initiated through the Committee on Relation of Electricity to Agriculture a nation-wide research program participated in by the farmers, agricultural engineers, agricultural colleges, electrical manufacturers, and utility companies, along with other agencies. Research in rural electrification continues in a number of state experimental projects, and a National Rural Research project is under way in Maryland. A vast body of practical information on adaptations of electricity to farm work has been developed and diffused. It aids the farmer in visualization of benefits of electric service to him; it stimulates us to greater effort in overcoming problems of extension of our service to him. The same intensive effort which successfully accomplished electrification of manufacturing industries is now being turned to the most important of all our industries—agriculture. The Association has this year sponsored important regional conferences on rural electrification, and has provided information of assistance to companies in establishing rural service departments.

Railroad Electrification

Increased volume of freight and passenger traffic, arising from growing population and advancing prosperity, has stimulated further attention by railroads to main line and terminal electrification. Electrification programs have been announced this year by the Pennsylvania, the Philadelphia & Reading, and the Lackawanna Railroads. Other railroads have electrification plans under study. It is certain that our railroads will make that use of electricity consonant with sound transportation development. We wish to assist them.

Accounting

The accountants of the industry have a great responsibility. The volume and complexity of accounts have grown to enormous proportions. They have been confronted with the task of handling current accounts as represented by gross earnings, which increased from 281.9 million dollars in 1912 to 1,900 million dollars in 1928. The number of customer records involving monthly billings has grown from 4 million to 23 million. The investment in facilities to be accounted for has grown from 2.1 to 10 billion dollars.

In this field of accounting the Association has been constantly on the alert, keeping pace with ever-changing conditions and problems and in step with industry progress. Every phase of accounting principles and interpretation has been made the subject of thorough research.

The Accounting Section is giving special attention to accounting for interconnection, merchandise accounting, budgeting, and the latest questions in the field of investment trusts.

Continued study has been applied to simplification of procedure in forms and records, particularly in simplification of customer records and bills. Savings attained in reducing cost of handling these accounts represent thousands of dollars. The care and attention given by our accountants to methods of maintaining customers' accounts and billings has been a most important factor in improved customer relations for the only point of contact with many of our customers is through the monthly bill. The Accounting Section of the Association is to be particularly commended for the excellent results attained in this direction and for their fine concept of the customer viewpoint in handling accounts.

With the growing proportions and complexity of the business the accountant will increasingly be called upon to furnish the records of the past and to visualize problems of the future as a base upon which our executives may make forward plans.

Public Relations

From the standpoint of morale, as well as of material things, I believe no twelve-month period ever has been better for the electrical industry than the one just passed. This is equally true of your Association.

During the year the industry, largely through the Association, has borne the brunt of the assault of those who would nationalize the country's industries, businesses and professions. Much of this attack has been directed toward the so-called public relations work of the Association—a work miscalled "propaganda." Despite this, the Public Relations National Section has carried on its constructive work of aiding and directing the industry in its duty of fully informing the public regarding past and present performance and future possibilities and obligations.

Among the many committee activities, all of which have consistently and persistently moved ahead under the able leadership of Vice-President J. F. Owens, Chairman of the Public Relations National Section are two outstanding developments. One is the study made of industrial relations by a committee of that name which includes Health and Medical and Employee Contact practices and instruction, serial reports having been issued and others being in preparation. The other is a study of the Migration of Industry made by the Metropolitan Life Insurance Company at the request of the Association and in cooperation with the Civic Development Committee of this Section.

Widespread as are the activities of this Section they constitute but a minor part of the overall activities of the Association, although a most important part, since future progress of the industry depends in no small degree upon the confidence the public has in the industry and its integrity and honesty of purpose. We feel that we are successfully doing our job—furnishing the best electric service in the world to our customers at fair rates, safeguarding the interests of our investors in our securities, and doing our part in helping to make this the happiest and most prosperous country in the world, and it is a part of that job to keep the public informed.

Commercial

Problems of marketing are confronting our industry no less than other industries producing products for distribution. We recognize an immediate need for concentration on our commercial possibilities. Potentially they are amazing, and the selling departments of our power companies are meeting the challenge with vigorous effort.

Surveys reveal our accomplishments of the past and unfold almost limitless opportunity for commercial expansion. Whether we vision the future all-electric home or the vast sales possibilities in the application of electricity in commerce and industry and in the industrializing of the farm, our conclusion is the same. "Serving the public" unfolds unlimited opportunity for business development.

Our commercial progress is affected by numerous agencies making the marketing of our service unlike that of other commodities. We cannot store our product; we cannot change our prices at will; we cannot transport and deliver always in the most economic methods; we have a limitation of territory in which we can market. In fact, we must build a market by building the community. And yet, we realize as never before how keen our competition is in the selling field.

Important problems of market analysis, the construction of industry-selling programs, the development of salesmen and methods to cope with modern requirements of highly specialized selling, are all being examined and promoted by our National Commercial Section. It is organized to meet the demand upon it for intensified activity and is rendering a highly valued service to the industry.

Geographic Divisions

The Geographic Divisions are recognized as the basic backbone of the whole Association. I have been enormously impressed as I have gone from one Geographic Division to another with the intensiveness, practicalness and thoroughness with which the respective Geographic Divisions and their committees are dealing with and mastering the problems relating to their respective areas, this not only through the Geographic Conventions but in the conferences and committee meetings taking place during the year. Also, I have been impressed by the contributions, coming from the several Geographic Divisions, which, through the agencies of the National organization, are diffused throughout the entire country, to the benefit of the entire industry.

An electric light and power company itself can make no enemies, can gain no friends, can do no wrong. Such friends as it has, those engaged in the industry must gain for it. Such enemies as it gets, those in the industry make for it. It has only such character as the men and women who are operating and managing those companies give to it.

So in going around the country and meeting the men and women from all sections, above all, I have been impressed with the outstanding character, the exceptionally high ideals of business conduct and integrity possessed by the men and women engaged in the electric light and power industry. They are seeking to operate the properties at a profit, of course, because a business service must earn its way if the business service is to continue, but there is a striking absence of greed among them. They are endeavoring to furnish a useful service at a reasonable rate of pay, and if you will notice the rates charged by this industry

(*Continued on page* 346)

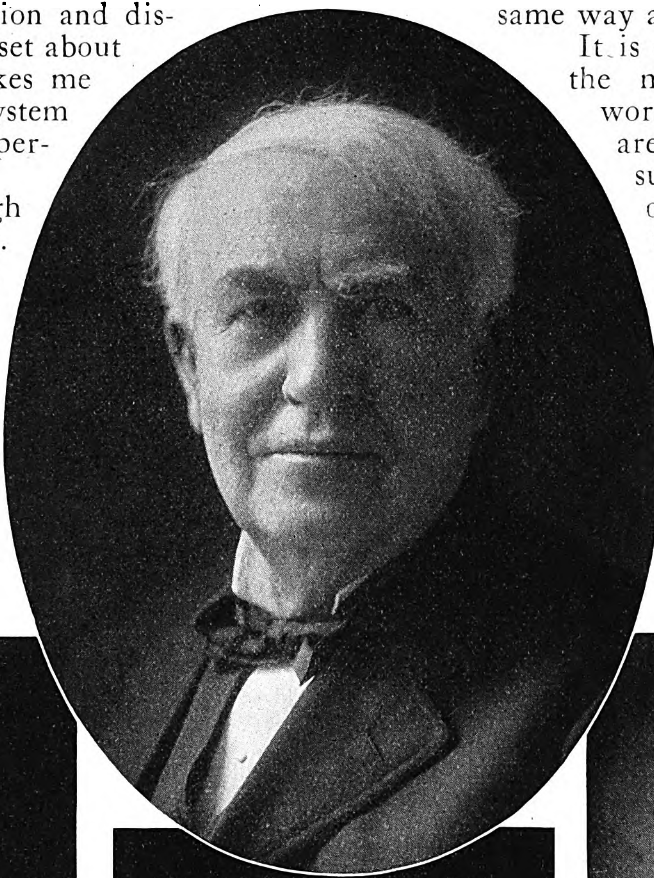
A Man for the Ages

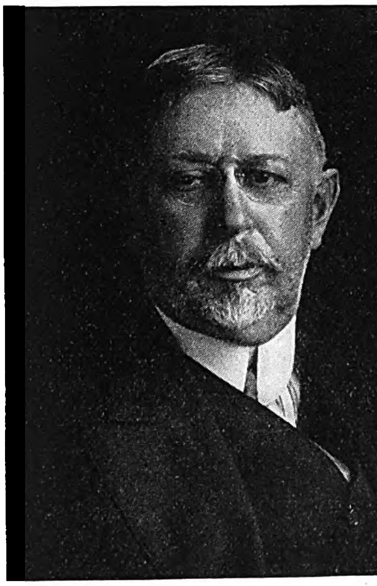
WHEN I invented the incandescent lamp, I realized that the lamp alone was not enough. It was necessary also to perfect a system of electric generation and distribution. I immediately set about to develop it, and it makes me happy to know that the system as well as the lamp still persists in all its essentials.

I had in those days a high opinion of my invention. All inventors have. But I must confess that I never dreamed that from it would come the stupendous electrical industry of today.

Naturally I am gratified to feel that I have been privileged to play a part in this vast achievement. I am proud of the electrical industry—of its vision, courage, zeal and devotion to public service; and I suspect every American feels the same way about it.

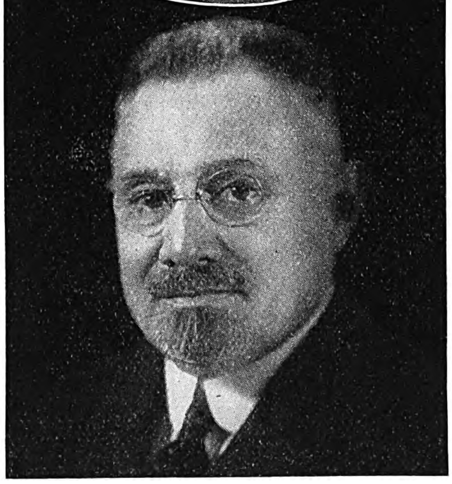
It is a great reward to me and the many colleagues and co-workers, who, I rejoice to say are still living, that we have survived to see the full fruit of our labors. The record is wonderful; but, fine as it is, it can be made still better and I have a feeling that in your hands it will be.—*Mr. Edison's Message to the Fifty-second Convention of the Association, delivered through the medium of the talking-moving picture.*





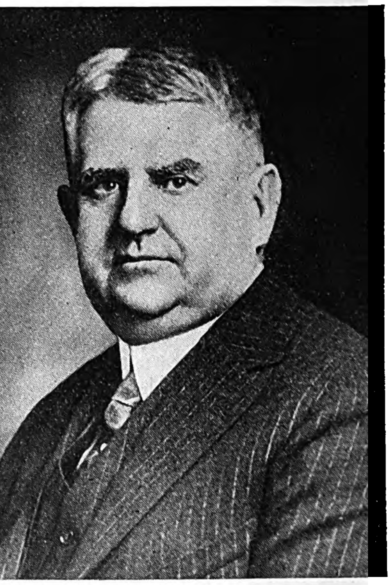
CHARLES L. EDGAR
President, Edison Electric Illuminating Company, of Boston

Though He May Be Acclaimed a Leading Scientist and Inventor, Though He May Be Pointed Out as the Highest Type of American Citizen, Those of Us Who Know Him Best Will Ever Proclaim Him, Above All, a Staunch and Faithful Friend.



JOHN W. LIEB
Honorary Chairman for the Edison Day program at the Convention

Triumph Has Been Realized Over Drudgery, . . . and the Industry Owes Him an Everlasting Debt of Gratitude.



THOMAS N. McCARTER
President, Public Service Corporation, of New Jersey

He Converted Scientific Speculation Into Practical Accomplishment, and Upon the Foundation That He Laid Has Been Reared the Great Structure of the Industry That Today Plays So Great a Part in the Economic and Social Life of This Nation.

Public Policy Committee Report

By W. W. FREEMAN

Vice-Chairman, Public Policy Committee, N.E.L.A.

Presented at the Fifty-second Convention of the National Electric Light Association, held at Atlantic City, N. J., June 3-7, 1929

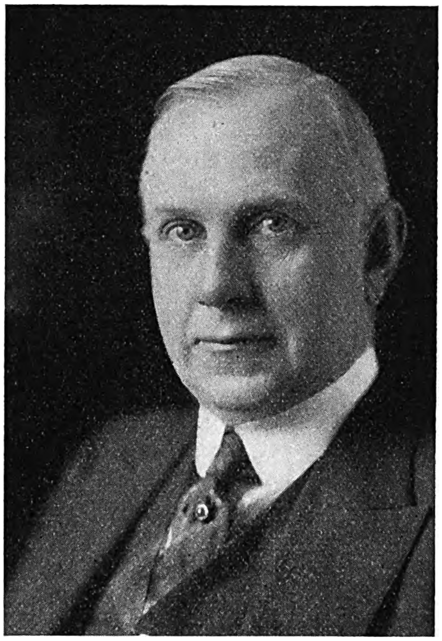
THIS year is "Light's Golden Jubilee." It is fifty years since Edison gave to the world the first practical electric lamp. In this lamp the electric utilities had their beginning; from it has developed the whole field of electricity's usefulness. It is fitting indeed at this time that we express tribute and appreciation to Mr. Edison and that we take some measure of the progress made by these utilities in expanding usefulness and in meeting public obligations in the provision of electric service.

Amid the rapidly expanding and changing character of electrical development, one policy stands out as having been uniformly and consistently followed by all and at all times. This is the policy of growth and expansion. The electrical industry has been progressive; it has not stood still. From the beginning, the men responsible for electrical development have realized the enormous contributions in useful service which electricity has made and will continue to make to the whole national and community well-being, to workers and to homes, to all phases of economic and social life. They understand and assume the obligation to unfold the full possibilities of electric service and translate them into everyday use for all the people, on farm, in village, and in large city. In its plans, its construction of plants and facilities, its organization and financing, the industry has looked to the future. Not only has it quickly adopted advances, but it has stimulated and searched for them.

Year by year, electric service extends; more homes are electrified, domestic use increases and takes on new forms; the service reaches to smaller and smaller towns and on to the farms; electricity is becoming the essential power supply for all purposes; the quantity of power made available for each worker increases. There lie ahead fields of still greater expectation for new and larger uses. The policy of aggressive development and expansion is still essential.

Herbert Hoover made the following statement before the World Power Conference in London, 1924:

"The factor that has been primarily responsible for the tremendous changes of the last century and without which modern civilization could not exist is mechanical power. The form which in increasing degree such power is being applied is electrical energy—the greatest tool that has come into the hands of man. The degree to which we utilize this tool as a substitute for manual labor will largely determine the rate of our social and industrial progress."



W. W. FREEMAN

Electrical development is progressing at a rapid pace. During the past seven years electrical service was furnished to nine million new homes, bringing the total to nineteen millions. No full measure can be taken of the benefit of this in improving family life, effecting economy in expenditure, the saving of time and making for happier living. Electricity has provided a power supply not only for factories but also for the homes. Thousands of electrical appliances are assuming the burden of house work.

Half a Million Farms Served

A distinct characteristic of electric progress in the last few years has been the extension of service to small towns and farms. Transmission lines, constituting a vast net-work even five years ago, have been still further extended to reach four thousand small towns and villages formerly without electric service. So widespread has this service now become that almost every community with more than one thousand inhabitants has electricity and in many parts of the country every community, no matter what its size, receives such service. Not only do they enjoy the benefits of electricity in their homes, but by it the door of industrial opportunity has been opened to the smallest town having also reasonable transportation facilities. The spread of service to the farm continues, until now five hundred thousand farms are connected. The objective of electric service for all the people comes nearer and nearer to attainment.

With the development of great interconnected systems and mass production of power, the factories and workers of the nation are increasingly turning to electricity for power supply. The total increase of 9,800,000 hp. in the nation's industrial enterprises since 1919 has been in electric motors. President Hoover's Committee on Recent Economic Changes in the United States, in its report of May 15, after emphasizing the widespread higher living standards as characteristic of our national life, pointed out that the rise in the use of power has been three and three-quarters times faster than the growth in population, and then added:

"The increasing flexibility with which electricity can be delivered for power has enabled manufacturers and farmers to meet high labor costs by the application of power-driven specialized machines, and power in the flexible form has penetrated into every section of the United States, including many rural areas. The survey shows that as a nation we now use as much electrical energy as all the rest of the world combined.

"Through the subdivision of power the unskilled worker has become a skilled operator, multiplying his effectiveness with specialized automatic machinery and processes. Thus the unit cost of production has been reduced, the drudgery eliminated from much unskilled work and wages maintained or actually increased."

Benefits of Interconnection Available to Public

There has been a clearer crystallization of public understanding of major trends and developments. The far-reaching economic and social benefits of interconnection, mass electric production, and large-scale development have become better understood. The function and usefulness of the holding company in bringing this about has become more generally understood. Mere size of operations causes less comment; the benefits accruing to the public from them are better comprehended. The public generally realizes that through large scale development, electric service is becoming possible to the citizens of the smallest village and to the dwellers upon farms, and that only in this way has there been created the reliable, adequate and low-cost power supply upon which the nation's industrial development is taking place. Experience has demonstrated the savings in expense, the financial stability, the fuller utilization of investment and resources, the increased efficiencies and larger capacity for service which follow unification and consolidation. They are accepted as economic necessities. Failure to apply them would indicate lack of progress.

Through the application of these principles, "as a nation, we now use as much electrical energy as all the rest of the world combined." And it should not be overlooked that all the rest of the world combined hitherto has, to a very large extent, followed the policy of governmentally owned and politically operated electrical supply, while this nation has followed the precept of the immortal Lincoln that "in all that the people can individually do as well for themselves government ought not to interfere."

The benefits of improved efficiencies, better management, large-scale development and advances in the art have been shared with the consumer. An outstanding characteristic of the past year has been rate reduction. The general cost of living continues at 70 per cent above pre-war levels; domestic electricity is 25 per cent under pre-war levels. In 1914, the average household used but 268 units of electricity; in 1928, the average used was 456. Beyond this electricity today will do more than it was possible for it to do then, for scientific advance has provided the consumer with better and additional methods of utilizing it.

Investment in Securities Shows Confidence

Large increases in demand for service; the necessity for large investments in facilities, which is characteristic of the business; the greater cost of furnishing service as it extends to sparsely settled territories, continue to require large sums of money in financing growth. In the year 1928, during this period of intensive governmental investigation, continued public confidence in private operation was demonstrated by the purchase of $1,600,000,000 of security offerings of electric light and power companies.

The year just passed has been particularly noteworthy for the public attention directed to the electric utilities. Their condition, methods, practices and performances have been a major subject of public discussion, which has ranged from vituperative attack and political abuse to sober and constructive consideration of major questions, and has covered most of the degrees between. Utilities today live under the microscope. In the scrutiny that they have undergone real performance in public service has often been overlooked, faults have been magnified and motives distorted. But, on the whole, discussion has redounded to their benefit, and it will do so still more when complete information becomes diffused and the public mind better informed.

The source of inquiry has largely been the Federal Trade Commission. Up to this time, its investigation has been directed largely to the National Electric Light Association, its Geographic Divisions and to publicity activities. The broad work of the association toward accomplishment of its object—"to advance the art and science of the production, distribution and use of electric energy for public service"—has as yet received slight attention. The local state information bureaus have been thoroughly investigated.

Federal Commission Given Free Access to Records

Although the association, as well as its divisions and the state bureaus was early apprised that there was doubt whether the Federal Trade Commission could compel the furnishing of much of the information sought, a decision was reached at the outset to comply completely and promptly with every request of the commission. In accordance with this decision, the commission representatives have been accorded full and free access to all books, records, papers, reports and correspondence of the association. No request has been refused. No question of right or authority has been raised. The result has been a most rigorous inquiry into every activity of the association for the last 20 years. Over one hundred witnesses have been heard, over 7,000 pages of testimony have been transcribed, and 4,300 documents and other exhibits have been introduced into evidence. We have voluntarily undergone a microscopic examination which has delved into records from the dust-covered volumes of the past to the fresh ink of the present, and into thousands of scattered incidents arising from one end of the country to the other.

We understand that this phase of the investigation on the commission side is now practically completed. The commission as yet has announced no conclusions. The industry has not as yet presented evidence in its own behalf. Public impressions have come almost entirely from newspaper reports.

Your committee is confident, as the result of this critical review of the activities of the association for the last half century, and without claiming perfection, that it will be found that its policies have been sound, its work beneficial to the public and the industry, its ideals consistent with the highest American business standards, its mistakes few and trivial considering the number of individuals involved and the large volume of work accomplished.

An independent press is essential to free government. The National Electric Light Association believes in an uncontrolled and undominated press, free to criticize or commend as conditions may warrant.

The utilities recognize that the furnishing of information regarding their purposes, accomplishments, needs and difficulties is one of the obligations of public service. In recent years the association and its member companies have made every effort to inform customers, investors and the public. To that end the association has utilized every opportunity for creating a more complete public understanding. On matters of opinion it has stated its own views; on controversial subjects it has given its own side. Endeavor has been made to correct inaccuracies and misinterpretations. It has done so openly and frankly. Publicity material of the association has always shown the source, so that every one to whom it was sent has known from whence it came. There may have been occasional instances of overzeal in distribution, but we may congratulate ourselves that criticism has been directed to excessiveness of publicity rather than to secretiveness.

At the last annual convention this association by resolution recommended to its members a continuation of the policy of preparing and diffusing as widely as possible full, accurate and timely information on all phases of the business. Truth and accuracy were declared to be the standards by which its statements should be judged. Your committee is glad to be able to report that out of the large volume of publications and informational items circulated by the association, all of which for recent years has been freely submitted to commission scrutiny, none has been found which cannot stand that test. The adverse comment which has been made upon association publicity has not been directed to its truth or accuracy, but rather to its volume and the methods of distribution. The same is true, with few exceptions, of the publicity emanating from the state bureaus.

The widespread distribution of informational material necessarily involves contacts with those who receive it. From

(*Continued on page 392*)

Public Relations National Section Report

By J. F. OWENS

Chairman, Public Relations National Section, N. E. L. A.

Presented at the Fifty-second Convention of the National Electric Light Association, held at Atlantic City, N. J., June 3-7, 1929

IT HAS been said many times, but will bear repetition, that, unlike most other businesses having an intimate bearing on the public well-being, the electric light and power business has grown up within the remarkably short space of forty years, and in that length of time has assumed staggering proportions and a relatively vital importance in the financial, social, industrial and educational life of the country. It might almost be said that it is the warp of our modern social fabric.

No small part of the progress made has been linked with the activities of the National Electric Light Association, of which the Public Relations National Section is a major division.

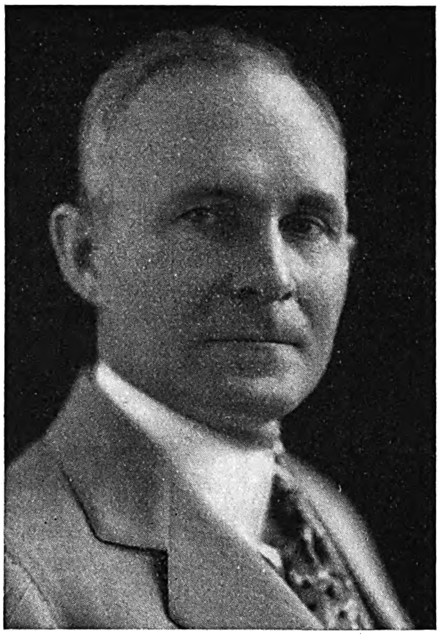
Purposes of the Section

The Public Relations National Section is organized for and devoted to the purpose of encouraging member companies to disseminate information that will give their employees and the public an understanding of the problems involved in the financing of electric light and power companies, and the furnishing, at fair rates, of continuous, dependable electric service. Its major purposes are:

> To encourage member companies in so developing and training members of their organizations that employees will be able to interpret the industry to its customers and the public;
>
> To act as a clearing house through which such ideas and practices as are found helpful in one company or section of the country may be made available to all;
>
> To bring about and maintain a ready acceptance by the public of sound securities issued by the industry;
>
> To be prepared, through study and research, to furnish accurate information on national problems mutually affecting the industry and the public;
>
> To foster and develop cooperative work with legitimate agencies for the dissemination of such information, to the end that friction born of misunderstanding or misrepresentation shall be eliminated and the stability of the electrical industry be maintained.

In the main, the work of the Section throughout the past year has consisted of the carrying forward of plans and policies evolved and partially developed during the preceding year.

As in the past, it has operated mainly through the eight major committees. These committees are:



J. F. OWENS

Cooperation with Educational Institutions
Customer Ownership
Industrial Relations
Information Bureaus
Manufacturers' Advertising
Public Speaking
Relations with Financial Institutions
Women's

Through the investigation still under way by the Federal Trade Commission, the activities of some of these committees have been the subject of discussion and editorial comment in the public press, and for that reason it is felt that in presenting this report a review of their purpose and function deserves special attention.

The Cooperation with Educational Institutions Committee and the Committee on Information Bureaus have been, during the past year, the focal point of attack from certain sections of the press.

Cooperation with Educational Institutions

The Committee on Cooperation with Educational Institutions was established in 1923. Its purpose, as set forth in the Organization Personnel, is "to bring about a closer understanding and better methods of education with reference to public utilities in the higher institutions of learning."

At the beginning it proceeded carefully and somewhat slowly in mapping out its functions and establishing a concrete program. This is justified as a matter of policy in any new undertaking along an unmapped course, and is entirely appropriate, first, in connection with an organization voluntary in its nature, and, second, in connection with any program which ultimately must be determined and approved by educational authorities of the nation.

In respect to the work of this committee in the past, it may be said that there never has been and is not even now a coordinated organization representing both the National Association and its Geographic and State divisions. This is not due, at least primarily, to any lack of appreciation of the importance of the matter itself, but, as pointed out in the National Committee meeting in 1926, it is primarily due to the lack of establishment of a national program and correct guiding principles of cooperation in the public interest on the one hand, and meeting the approbation of educational authorities on the other. At the 1926 meeting of the committee, it appeared very clearly that two things were necessary:

First—The mapping out of a cooperative program, useful in itself, and meeting the approbation of educational authorities.

Second—The establishment of such machinery within our own organization, always recognizing its voluntary nature, as would be best calculated to carry out the program that was finally established.

It was with the thought of ascertaining the extent to which this cooperation has existed, and with mapping out a program through which it might be promoted, that it was finally determined by the Committee which had already made recommendations as to cooperation that the definitive program should be based upon an actual survey of the situation in respect to cooperation in the various parts of the country, and this led to the securing of the services of Dean C. O. Ruggles, then with the Ohio State University, for the purpose of making such a survey. This survey has been carried out, and a report made by the Committee will be forthcoming in the near future.

Recommendations of Educational Committee

During the past year there has not been a meeting of the full Committee. The educational members have been in conference with Dean Ruggles in connection with the survey. The matter of organization within our own ranks seemed to be one which should primarily be given study by our own representatives, and the utility representatives on the Committee met on March 4 and 5 of this year. They made a report and recommendation for consideration by the Executive Committee of the Public Relations National Section. This report and recommendation is as follows:

"This committee has considered the general situation in respect to cooperation by the industry with higher educational institutions. In our opinion it has been clearly demonstrated that this cooperation is not only of mutual benefit but that it serves the public interest and should be continued and further developed.

"There are, however, certain essential facts which we believe worthy of the most serious consideration. During the last year, this industry has been subjected to criticism in relation to some of the cooperative activities, and there exist in some quarters a misinterpretation of our motives and the opinion that there has not always been shown a complete appreciation of the high ethical standards which must at all times prevail in such activities. This committee is convinced that modification of our present organization would reasonably provide in the future against any occasion for adverse criticism of cooperative relationships and further strengthen the field of useful cooperation.

The actual functions of cooperation have been generally exercised by organizations neither directly related to, nor cooperating with, this committee. The committee has lacked such contacts with State or local cooperative agencies as are essential for the formation and promulgation of national policies.

"We recognize the fact that cooperation cannot be exercised efficiently or in the public interest merely through a centralized committee out of touch and inadequately acquainted with local conditions, demands or sentiments. Our organization rests upon a basis of voluntary cooperation as its mainspring. The major responsibility must remain local and any attempt at centralized control would be ineffective. A survey of the entire situation leads us to the following conclusions:

"First: That it is desirable that there should be established in an authoritative way guiding principles to control future cooperative activities, such principles being in general those which should prevail between educational institutions on the one hand and electric light and power companies on the other hand. It is our belief that such principles can be best declared in an authoritative way by educational administrators of national standing and experience. We recommend to our association the furtherance and encouragement of such measures as may be best fitted to secure such declaration of principles.

"Secondly: We recommend more efficient cooperation within our organization to assure sound development of relations with educational institutions, free from legitimate criticism, and such as to sustain with the educators that confidence in our activities and purposes that must at all times prevail if the best interests of the public and all concerned are to be served. We believe that the following plan will lead to this result without trespassing on the full measure of local responsibility in such activities and we recommend that steps be taken to put the plan in effect in the immediate future.

"We recommend that each geographic representative of this committee take up with leading executives in each State within his division the initiation of such steps by the utility executives in connection with administrative heads of educational institutions as will bring about in each State the selection of an industry representative satisfactory to the educational institutions to whom in each State there shall be referred for approval all proposed cooperative activities.

"We further recommend that such representatives be requested to act as the State representatives on the geographic division committee of this committee."

These recommendations have been indorsed by the Public Relations National Section Executive Committee and by the Executive Committee of the National Electric Light Association.

The Industry Deserves the Attention of Educators

Certainly our industry, occupying such an important place in the scheme of things, deserves the careful attention of educators. So rapidly has it grown and so rapidly is it developing that it is almost beyond the power of those in intimate contact with its development, those who are wont to call themselves a part of this development, those whose brains and minds and hearts are given to it, to keep abreast of its progress in all of its phases.

If this business of ours is destined to play in the future even a more important part than it has in the past in the social, economic and industrial life of the nation, it is important enough to have brought to bear upon its development the best thought of the best trained minds in the nation. It is important enough that the youth of the land, who are being poured out annually from the colleges and universities of the country into this whirlpool of the present social order, are allowed to drink from the running stream of current facts, rather than from the stagnant pool of worn-out ideas, pools poisoned as they frequently are by the sophistries of discredited theorists. That the youth of the land, going forth from our great universities to be the molders of public opinion in the future, should have the benefit of facts relative to the evolution and operation of our business goes without saying.

If the students of the universities and colleges are to drink from the pure stream of current facts, they must have free access to the only reliable source of information—the great operating utilities of the electric light and power industry.

It is through these companies that the product of the mind of thousands of men and women, who have been and are engaged in research and study into nature's laws, and the product of manufacturers, who have taken these laws and fabricated out of them instruments through which the laws might be applied for the comforts and conveniences of mankind, have found practical application to the everyday needs of modern life of the mechanical genius of the one and the discoveries of the other.

What better than the operating companies can be found to serve as a basis for authoritative information on the application of electricity to modern day needs? Where is the educator to go, if not to the electric light and power companies, for the information that he needs in fitting the young minds in his charge to cope with the problems which the introduction of this new force is bringing to the social order?

It was with the full realization of the duty that the electric light and power industry owes to those whom it serves—that they should be able to secure from authoritative sources accurate information on our business—that the Cooperation with Educational Institutions Committee was established. For, let it be said here that our obligation to the public does not end with the furnishing of an ample supply of electric energy at the entrance switch to the house or factory. We owe the public the duty of seeing to it that the information given to the youth of our land is accurate, current and in keeping with the facts.

Be it said in passing that most of the cooperation that had hitherto existed between educational institutions, on the one hand, and electric light and power companies, on the other, had its inception in the eagerness of educators to gather from electric light and power companies the facts needed for the proper presentation of the industry's place in the modern scheme of things.

Be it said further that in too many instances electric light and power companies are yet unmindful of their obligation, not only to those of our own time, but to those who shall follow, and are indifferent to the justice of the request of the educator and to the importance to the industry and to the public of complying with his request. I believe it to be the duty of those engaged in the electric light and power industry, when they realize that institutions of higher learning are not being adequately supplied with facts relative to our business, to take the initiative in seeing that such contacts are made as will warrant educators in believing that they can secure accurate information about the financing and operation of electric light and power companies.

Public Utility Information Bureaus

Mention was made earlier in this report of the activities of the various information bureau organizations.

Information bureaus were established in most of the States of the Union, in keeping with the feeling on the part of many leaders of the industry that the public should be kept fully informed by operating companies, using for that purpose the recognized channels of information, and to set up for companies unable to maintain such equipment for themselves, a vehicle through which this information could readily be conveyed.

In the main these bureaus have served a very useful purpose, and through their operation has been set up a source of information which the recognized media for the dissemination of facts have found to be authoritative and helpful. Newspapers have in the past come to lean on these bureaus for news that to them appeared timely, relative to the progress and growth of the companies in their State. Speakers and writers have found the information furnished by these bureaus timely and accurate.

Since the establishment of the information bureaus, however, mergers and consolidations have eliminated many of the smaller companies, making it possible for the units so formed to maintain, as a part of their personnel, experts in the matter of assembling and distributing information relative to the operation or financing of the companies. For this reason there has grown up in the minds of some a feeling that the usefulness of the information bureaus has passed, and that their functions can well, and perhaps better, be taken over by the operating companies themselves, who, after all, are charged with the responsibility of seeing to it that full and accurate information is obtainable by and given to their customers.

The question of the continuance of these information bureaus is food for thought, but it is felt that the solution lies with the individual companies within the States maintaining bureaus.

Confidence in the Industry

Any business, if built on a lasting foundation, must have the confidence of those whom it essays to serve. To gain this confidence and hold it, the organization must deserve it. A business can deserve it only by adopting as a policy in the transaction of its business the old-fashioned virtues of honesty, fair dealing, straight-forwardness, and a willingness at all times to give fully and freely information of any kind and character pertaining to its business.

Particularly in the utility business is confidence the basis of any sound and lasting prosperity.

As one studies the progress of the human race and the development of society, he is convinced that no movement that has made for social progress has long lasted unless it had as its motivating force a conscious purpose to make of the movement something beneficial to those whom it would serve.

Business is but one branch of our social order. But lasting business, like any other function of society, must have as its objective a beneficial influence on the race.

Measured by this test, our business has within it an inherent contribution to the advancement of the social order.

Through the use of electrical energy, men and women are relieved of back-breaking drudgery and hours of endless toil. Their God-given minds are free to reach out toward higher development. We are no longer content to do with manpower the hard work that can be accomplished with electricity and steam.

Each month, in fact, almost every day, new applications are being found for electrical energy. New machines are being perfected to relieve man of still another form of labor. The American farmer, through the application of the products of American inventive genius, soon will find the drudgery which constituted the greatest obstacle to the retention of keen business minds on the farm a thing of the past. Already the isolation characteristic of the farm a few years ago is but a memory. Electricity has done all this, and we have been a part of it.

It is interesting to contrast the present-day mode of life with what obtained ages ago, when human lives were held cheaper than the products of the quarry, and thousands of men were worn out in the erection of the great structures that stand as perpetual protests and reminders of the sacrifices of human energy that went into their making. Contrast our present age with the days when men were chained as slaves to the galleys, pushing vessels of war and commerce across the seas; and, even in later years, the days when not only men but women and children toiled out their lives in the mines, factories and workshops of industry. American genius, American enterprise, fostered by American individualism, aided by American business, is fast bringing us to the time when, in America, electrically driven machinery will do our every task.

Through the efforts of the men of this industry, in cooperation with manufacturers and scientists, electric power plants are taking from the earth its stored energy in the form of coal, oil and natural gas, and converting it into the most mobile form of energy—electricity—and transmitting it to the home and the factory and with it performing the labor of 350,000,000 men.

Think of it, every man, woman and child, on an average, in America, has at his beck and call three willing, tireless servants, never complaining, ever ready to do his bidding. Is it any wonder that America is prosperous? You men and women of the electrical world have seen your genius, your industry, your enterprise, remake a world. I say, therefore, and I say it with pride, that our industry has within itself inherently those qualities which, if honestly applied to the service of mankind, should and will insure its stability and its lasting prosperity.

Our task is made the more difficult because we are, by the very nature of our industry, a monopoly. The lengths to which men have gone to free themselves of monopolistic power have demonstrated the fact that men do not readily give up the right to pick and choose of their own free will those upon whom they would bestow their patronage. We, therefore, have a handicap in obtaining and retaining public good will not encountered by those engaged in competitive businesses.

What Our Future Depends Upon

The industry has been successful in applying the laws of nature and the products of inventive genius to our problems. We have won the confidence of the leaders of the financial world. This is much, but it is not enough. Our future depends upon the degree to which we can obtain and retain the confidence of those who, in the last analysis, are the makers or unmakers of business and government, "the folks back home."

Years ago, the immortal Pope said, "The proper study of mankind is man." What a world of philosophy, what a treatise on all human relationship is bound up in this short terse sentence.

After all, it is not enough that we conduct our business with honesty of purpose, with an unselfish desire first of all to give to our customers the full measure of service, beaten down and running over, but that our customers must know and feel within their inner-being that we are honest. In short, they must believe in us. This is my reason for saying that, in the end, public relations begin and end within our own organization.

Our business has grown up through an era of great mechanical development. The best minds of the world have been directed toward drawing from the mines of the hidden recesses of nature her jealously guarded secrets. They have patiently, by day and by night, woven these secrets into recognizable laws. Other men, through employment of their inventive genius, have made it possible, through the development of mechanical processes, to apply these laws. We have taken up the gage at this point and are carrying it forward for the benefit of the home, the farm and the factory.

We have been very careful in the selection of the mechanical equipment that enters into our business. We have employed every known test to determine its fitness for the job. But have we been as careful in the selection of the human element, chosen to interpret our business, and the organization we have set up, to the public? In the end the public will think of us as they think of the men and women whom we have associated with us as the interpreters of our business to those intimate circles with whom these men and women come in contact. The question, therefore, of so-called industrial relations is at the very heart of our public relations.

Industrial Relations

The Industrial Relations Committee of the Public Relations National Section has been formed for the purpose of giving to this all-important phase of our business the intensive study which we have hitherto given to the mechanical aspects of the business. No man or woman should be selected for a position in an electric light and power organization until, at least, every known test by which his fitness for the job, and the determination of whether or not he possesses the qualifications to assume greater responsibility, has been applied. This is not enough. He must be so informed about the business in which he is engaged that he can properly and adequately interpret this business to his neighbors and friends, and I am of the belief that, to the extent that he goes beyond the sphere of his ordinary activity to extend opportunities for this interpretation, to that extent does he merit recognition and advancement. Nor yet is this sufficient. In the mechanical field we are wont to test from time to time the condition of the equipment employed, properly to discharge its functions. What about the human element of our business? Are we concerned about the conditions under which the men and women employed in our industry work, and do we go beyond the hours of employment and learn of the stresses and strains that may sap their mental energies and may impair their fitness for the job? In too many instances I fear not.

When we have given at least as much attention, care, thought and study to the human element of our business as we have given and are giving to our mechanical equipment, then, and not until then, shall we have the right to expect our employes enthusiastically to help us build our organizations into, and a part of, public confidence and good will.

In the past year the Industrial Relations Committee has issued two serial reports. These reports are the result of special surveys made to determine what methods and means have been employed in the selection and training of electric light and power company employes, and what measures have been adopted and followed by progressive companies in safeguarding and promoting the health and happiness of employes. I commend these reports to your earnest consideration, feeling, as I do, that they are a real contribution to our business.

Other Committees

The Customer Ownership Committee brings to the industry a very definite recommendation. On the theory that our responsibility to our stockholders does not end with the acceptance by them of our securities; on the theory that the good name of the industry is something of which we should be most jealous, the Customer Ownership Committee feels that there should be some sort of impartial tribunal to which men and women, who have purchased our stock and are offered in exchange therefor other securities known to us to be of doubtful value, may appeal, with a consciousness that they shall secure an unprejudiced verdict. Therefore, the Customer Ownership Committee recommends cooperation on the part of electric light and power companies with the Better Business Bureaus of the Nation. These bureaus are doing a great work. They have the facilities for impartial investigation. They should be supported. The recommendations of the Customer Ownership Committee have been approved by the Executive Committee of this section, by the National Executive Committee and by the Public Policy Committee.

The Public Speaking Committee has had a remarkable year of achievement. More talks by employes about our business, in an unselfish effort to interpret it to the public, have been made this year than ever before. But the important phase of this public speaking program is not the number of talks that have been made, but that "something" which, once an employe has been able to give expression to the thoughts that are in him, wells up and makes of him a different man or woman. As a method of employe training, I commend to the electric light and power companies of the country public speaking.

Our relations with financial institutions were never better. We enjoy the confidence of the investing public.

I cannot close this report without paying a tribute to the marvelous spirit that has been developed among the women of our industry through the activities of the Women's Committee. Cooperating, as it has, in that most estimable of all recent departures, the home service movement; pointing the way, as its leaders have done, to the women of the industry to enlarge their opportunities for service, and to broaden their sphere of activity; encouraging, as this Committee has, our women to know their organization, to know its policies and its hopes, and, knowing, to interpret these policies to the women of the nation—this Committee has made a lasting contribution to the industry.

We owe to Miss Malicki and her devoted staff a debt which is beyond our power to liquidate.

It has been my good fortune during the past year and a half to come in contact with many of the leaders of our industry. I say to you in all frankness and sincerity that I do not believe there will be found in any other line of business, on the whole, men and women more genuinely interested in the well-being and welfare of those whom they serve. I have found, by and large, that these men and women are recognized in the communities in which they live as leaders of thought and leaders of action. They are known to be good citizens. They are a part of, if not leaders, in every movement in their communities, making for progress and community betterment.

Friends, these men and women, and not a few scattered individuals who may have so far forgotten themselves as to exploit the public for their own individual selfish ends, constitute the electrical industry in these United States. These energetic honest citizens, engaged in our great business, might hurl into the teeth of their critics this query: "What, sir, have you contributed of your energy to the well-being of labor and industry? How have the fireside, the farm, the mine and the factory and those toiling therein been benefited by your life? We, of the electric light and power industry, have hazarded our all in bringing to our citizenship opportunities for greater leisure, greater comforts, greater happiness. What have you done, except to carp and criticize and to hinder? Are we, the honest men of the industry, to be pilloried because a few have gone the way of many other

(*Continued on page 372*)

Commercial National Section Report

By MARSHALL E. SAMPSELL

Chairman Commercial National Section, N. E. L. A.

Presented at the Fifty-second Convention of the National Electric Light Association, held at Atlantic City, N. J., June 3-7, 1929

IF we have made commercial progress this administrative year, a great degree of credit belongs to Mr. C. E. Greenwood, Commercial Director, N. E. L. A., the Vice-Chairman, Committee Chairmen and Committee Members. We have received inspiring assistance from the officers and members of related committees throughout every Geographic Division; helpful counsel from Paul S. Clapp and N. E. L. A. Headquarters; splendid cooperation from the other National Sections and Committees, and profited in large measure from our contacts with the Society for Electrical Development. It has been a pleasure and revelation to me to be associated with the sound thinking, well-informed men and women who are so successfully carrying forward commercial work.

The Commercial National Section has approached its work this year with full appreciation that the electrical industry is a predominant factor in constructive upbuilding of American production. We realize that the unique relationship of our industry with all commercial and industrial activities daily carried on throughout this country has afforded unequalled opportunity to reduce production costs by invention, science and standardization, thereby helping to establish and maintain exceptional wage and living conditions.

We Cannot Rest on Past Performance

Our light and power companies can be justly proud of their contributions to the practical needs, comfort and welfare of the public generally and the millions of customers they serve. They cannot, however, rest complacently on past performance. To remain an agency for constructive achievement they must take full advantage of present abundant opportunities and be ever alert to future possibilities.

We have kept in mind the billions of dollars our light and power companies have expended for facilities to conduct their business. We know, too, these dollars were not secured, except in small part, from earnings; but from the sale of bonds to financial institutions; preferred stocks to individual investors, including a veritable army of company customers; and common stocks, in most part, to investment companies, without whose assistance through such purchase and extension of general credit, management and engineering skill, our operating companies could not have properly kept pace with their rapidly expanding business.

MARSHALL E. SAMPSELL

We realize we are no longer living in the years during and following the war, when we were seriously put to it to provide facilities to serve our fast-increasing loads. Our problem during those trying years was: How can we finance additions to our properties to carry the loads brought to us without solicitation? Our problem now is: How can we most intelligently bring about greater diversification in the distribution of our product—electricity—to more surely safeguard the heavy investments already made, and yet to be made, for generating capacity and distributing facilities?

To protect investments made in transmission lines interconnecting smaller communities and extending into rural districts, where there exists little industrial activity, requires larger volume of electric service in small-town homes and on the farm. To successfully meet these obligations we must sell more kilowatt-hours through intensive development of new markets that will improve load factor. To bring about and proportionately enjoy intensive development of these new markets is no boy's play. In this undertaking we are forced to meet keen, well-organized competition from other industries, equally anxious to grow and prosper.

To intelligently educate our present customers and others to greater and more diversified use of our service; provide them with suitable energy-consuming devices to enable them to so use the service; and obtain more helpful information for the industry, the Commercial Section was reorganized last August into four bureaus, namely: Lighting, Merchandising, Commercial and Industrial Power and Heating, and General. Each bureau, except the General Bureau, embraces certain committees of related activities and is under a Vice-Chairman. The General Bureau committees report to the Section's Chairman. This arrangement has coordinated our own committees; harmonized more completely with Geographic Division related committees; permitted separate bureau meetings, and made unnecessary frequent group meetings of the Commercial Section. Excellent cooperation from Geographic Divisions has resulted in increased attention to commercial development throughout the country.

Teamwork Essential

The slogan of the Commercial National Section last year was: "More Kilowatt-Hours per Capita." Our slogan this year is: "More Kilowatt-Hours Through Group Teamwork."

If our industry is to secure a larger share of the consumer dollar, the executives of our operating companies must bring about closer departmental teamwork within each company, so that our engineers, accountants and other principal operating officials may look beyond the specific work they perform into the commercial field where cooperative effort is now required. This cooperative effort will lessen sales resistance and assure new service income that will result in financial advantage to the company and rate advantage to the customer, whose consumption of more kilowatt-hours, better diversified, provides the basic source of net earnings for the company.

Group teamwork is equally essential

between our National Association and the respective Geographic Divisions and State Associations. Our National Sections were undoubtedly created to better perform work most closely related to subjects assigned them, and it is only by group teamwork between these separate National Sections and corresponding sections or committees of Geographic Divisions that we can expect to properly handle the mass of work involved at least expenditure of money, time and human effort.

It would, therefore, seem the slogan, "More Kilowatt-Hours Through Group Teamwork," accurately describes the goal we have in mind for our Association, whose avowed purpose is: "To Advance the Art and Science of the Production, Distribution and Use of Electrical Energy for Public Service."

The need for group teamwork between our four major national associations and the electrical leagues was the impelling reason for reorganization of the Society for Electrical Development in 1927, resulting in more sympathetic understanding of the commercial problems that so vitally affect the electrical industry.

We have kept before us our common need for greater consumption per unit of industrial power and domestic service and the existing possibilities for scientific development and diversification of commercial and industrial power and lighting. Consequently we have been studying the principal handicaps to our commercial progress and planning how to deal with them.

One of the most serious handicaps to commercial progress is adequacy and price of wiring, due largely to code restrictions. The principal reason wiring in general is not adequate is that ADEQUACY has not been sold. Present costs of wiring are perhaps not too high under the conditions of present wiring jobs. Our Wiring Sales Committee has been working with the Codes and Standards Committee and Engineering Section on the National Electrical Code and the whole wiring situation. We have had several joint meetings with representatives of the National Electric Manufacturers Association respecting certain drastic changes in grounding rules. These meetings have been of value to the entire electrical industry and afford concrete example of the advantages of group teamwork.

Rate Structures

Another serious handicap to our commercial progress is that our rate structures are not sufficiently conducive to broad promotion of electricity. It is not contended these rates are too high, but that their form is not calculated to encourage the most liberal use of energy, which must result in a lower average rate to the consumer. The price of energy is one problem over which our electric light and power companies have most control and, if we can solve that problem, we can better compose commercial problems in which others have a mutual and beneficial interest. The Promotional Rates Committee of our Section has been studying rate forms for domestic service and the relation of existing rates to development of household appliance loads.

Another handicap to our commercial progress is price of energy utilization equipment and quality standards in types of appliances. Prices may not be too high for the present demand, but are they not too high to permit universal acceptance and use of them by the average housewife who perhaps needs them most? Our Section is carefully examining quality standards, as affecting costs, performance and market acceptance of both low and high-priced models.

Our intensive study of handicaps to commercial progress has not caused us to lose sight of other avenues for load building.

We appreciate our business is each year becoming more highly specialized. To stimulate intensive training of commercial men working in specialized fields, training schools have been held during the year covering Electrical Advertising, Home Lighting, Industrial Heating and Commercial Cooking. The success of these undertakings merits repeating them.

Our Section has made conspicuous progress in impressing the advantages of proper illumination, instead of lighting for vision only. Through group teamwork with architects and lighting departments of our companies, we are bringing about more adequate wiring for higher standards of illumination. The method of marketing electricity for electrical advertising and lighting of streets and highways is being pushed. both for its commercial value and civic betterment.

Our power committees are studying commerce and industry to more intensely promote electricity for every power and heating need. Highly creditable reports covering specialized fields have been developed to equip our salesmen to show the advantages of electric power over supposedly more efficient means offered by our competitors.

Another phase of our Section's work has consisted of searching for facts concerning particular classifications of our business.

A Water Heating Survey of national importance is under way, the field work being done by the Engineering Section at Headquarters. This survey will doubtless clearly indicate the water-heating service is of value to the customer and affords wide opportunity for desirable revenue.

Another fact-finding undertaking of consequence to rural customers and our business is the work of the Farm Appliance Sales Committee. Its personnel includes representatives from the Rural Electric Service and our Merchandise Sales committees.

An activity deserving particular support is the plan of our Refrigeration Committee to nationally point out the relationship of food preservation to health. This plan is non-commercial, includes all groups interested in food preservation, and will be carried to completion by the National Food Preservation Council, of which Matthew S. Sloan is President.

Under the auspices of the Society for Electrical Development, the Commercial Section is taking part in a thoroughgoing search for facts as to adequacy of wiring in typical American homes; number and nature of electrical appliances used in the average household; consumer interest and appreciation of the value of electricity; and ways and means to develop a larger market for electricity in the homes of this country. This survey was made by a leading advertising agency under specific instructions of the Sales Plan Committee of the Electrical Industry Sales Conference. At this afternoon's session of the Commercial National Section W. W. Freeman, President of the Society for Electrical Development, will discuss the present status of this plan, its value as an agency for intensive development of our markets, its advantages as a messenger of good-will and far-reaching benefits to all elements in the electrical industry.

Our Association's monthly BULLETIN has carried the Service Suggestions of the Customer Relations Committee. The informative and useful data furnished through this committee has doubtless been followed with interest by all commercial executives and field men.

Our Section is cooperating with the Accounting Section, through a joint committee, in further effort to adjust the accounting problems our enlarged commercial activities have occasioned.

Trade Relations

The Commercial Section has been closely studying merchandising methods of others engaged in selling household electrical equipment. Despite our close contact with our domestic customers, we can never satisfactorily develop a maximum volume of appliance sales until we have the complete and cordial support of all other classes of merchandisers of electrical appliances. It is not to our interest, nor have we the slightest desire, to monopolize the appliance business. It is our desire to so plan our sales programs as to encourage and assist the manufacturers and dealers who are helping us promote acceptable labor-saving and convenience services. It is respectfully recommended that the Declaration of General Merchandising Principles agreed to by all concerned and the electrical merchandising standards suggested by the General Merchandising Committee of our Association be followed, as guide posts to better trade relations.

Just a few years ago the local craftsmen carried on the manufacturing of the country, and business consisted of small isolated transactions. There was no such thing as massed production, massed capital or corporate machinery. Events of importance were known many moons after their occurrence. Light came to us from the tallow candle, kerosene lamp, and open fireplace. The kilowatt-hour, the untiring helpmate of humanity, was a stranger in the home, workshop and on the farm.

Today we are fully advised of the world's activities when and as they take place. The radio, telephone and telegraph and transportation on rail, rubber and in the air make time and place factors of small consequence. The availability of electricity for countless light, heat and power purposes has raised man's stooping shoulders from endless labor and relieved the weary housewife of hours of toil.

To one man, above all others, is due this marvelous transition from primitive days into an era of ever-increasing growth and expansion of industry, business, transportation and communication. This man has made it possible for us to translate the dreams of our electrical industry into time and labor-saving realities.

The commercial members of the light and power companies throughout our land are impatiently anxious to participate with all the world in honoring that man, Thomas A. Edison, and through Light's Golden Jubilee, to felicitate him on the occasion of the fiftieth anniversary of his invention of the first practical incandescent lamp and the system of electrical distribution that has made possible our own great industry whose good name we so zealously guard.

Voices Across the Sea

Speakers in Moving-Talking Pictures filmed especially for the Fifty-second Convention of the Association

Dr. Alberto Pirelli
Milan, Italy

"AS President of the International Chamber of Commerce, I am happy to voice the admiration of business men of forty-six nations, for the work of the inventor and for the development of scientific research. And in no place is this work more manifest than in the United States.

"No one knowing anything about the electric light and power industry can picture it as being, or becoming static in any country, and least of all in the United States. Public appreciation of electricity arrived long before its economic victories. It was accepted that it would do the things that people expected of it, and it always exceeded expectations.

"It has brought untold benefits to industry and commerce, and has provided comforts and leisure for the home, so that great multitudes enjoy a freedom and a dignity beyond that which earlier civilizations allowed. And for much of this the world is indebted to the inventive genius of Edison.

"Years ago Beethoven was conducting a performance of his Ninth Symphony. So moved and entranced with the beauty and majesty of the music did the audience become, that they stood and applauded the composer enthusiastically. But Beethoven heard not, heeded not; for his ears were deaf to their cheers. For years Edison also has lived in that silence which Ibsen calls 'the home of the strong' and my hope and heart's desire is, that if he cannot hear, he may at least sense how great is the gratitude of a world which this day salutes and cheers him as one of its worthiest inhabitants."

Sir Ernest Benn
London, England

"THE civilization of each generation through the whole of history has rested upon the private property made, owned and cared for, by the previous generation. There is no exception to this universal and age long experience.

"On the other hand each generation has been handicapped with the debts of its forefathers, represented only by the blunders of public ownership.

"The private individual tends always to acquire wealth—real wealth—which remains in the community for its comfort. No community has ever acquired anything worth mentioning but debts—the opposite of wealth.

"The property in the hands of public authorities of the world today is not worth more than 5 per cent of the amount of the debts of the same authorities.

The economically perfect society wants the maximum of wealth—houses, railways, electricity plants, steamships, machines, and numbers of other things. All experience shows that the private individual, through private ownership, is the only agent that can be trusted with these things. He makes them, he cares for them, and he passes them on, free of debt, to the next generation.

"Can there, then, be a shred of doubt in the mind of any reasonable man that the public good, the well being of society. the advancement of civilization, the raising of the standard of life of the people, and all the highest and the best of economic aims can only be secured by a firm adherence to the principle of private ownership.

Sir Kengo Mori
Tokyo, Japan

"AN invention whose advantages can be enjoyed by only one section of the community, or the people of one country, cannot be termed a true blessing. But the electric lamp is a true blessing in the sense that its beneficence extends to every man, every woman, the world over.

My country was lighted at the rate of one lamp for every two people in 1927. No later figures are available, which fact throws into a relief as clear as the illumination I am talking about, the rapidity of the expansion this public utility is making. Official statistics cannot keep pace with its progress.

"The electric lamp has a sister, equally admired, more vocal; but less enlightened. I refer to the telephone. This lady, however, is less fortunate and is often seduced in Government hands. Her virtue is not therefore always irreproachable.

"There are three virtues which are rarely possessed combined by mortals,—beauty, cool head and a warm heart. The only thing I know which possesses them is a mountain in Japan. Its name, which must surely be known almost as universally, is Fujiyama. It is beautiful in form. Its head is cool in perpetual snows; and its heart is warm with internal fires. But it has its peer in the electric lamp, which is a happy mixture of these three virtues.

"Let us hope that this wonderful creation may make still further progress in the days that are to come, and in its gathering strength bring light upon the questions which trouble mankind; and in the solution of which the West and the East must join hands."

The Exhibition

IN conjunction with the N. E. L. A. Convention, which was the first to tenant the new Atlantic City Municipal Auditorium, just completed at a cost of $15,000,000, there was staged the largest exhibition of electrical equipment that has ever been under one roof. The mammoth hall of the Auditorium was crowded with the displays of over 200 manufacturers of electrical equipment requiring more than 97,000 square feet of floor space. Many of the exhibitors vied with each other in their lighting effects and the many models of their products. There was every conceivable sort of apparatus for generating and distributing electricity as well as for its consumption in the home, factory, in transportation and on the farm.

There is perhaps no other place, it was remarked at the show, where it is possible for one observer at one time to view such a cross-section of electrical equipment. The engineer and the commercial man, by one trip around the immense room were able to see the products of practically all the manufacturers that produce for their fields. The obvious advantages of this to the entire industry has made the N. E. L. A. exhibition the outstanding affair of its kind in American industry.

Measured merely in terms of magnitude, this year's exhibit marked a rapid forward stride. There were almost 25 per cent more exhibits than in 1928. This year's total is 226, against 210 last year, and 194 the year before. The rise from 41 exhibits in 1908 represents real progress, and more than a dozen of the original exhibitors had displays this year.

For two days preceding the opening of the convention the public was admitted to view the exhibits. This provided an educational opportunity of no small importance to the public service companies, as well as the exhibitors, to show the public a wide range of heavy apparatus and appliances which constitute the backbone of the country's generating and distribution systems. Improvements to increase reliability and operating convenience were outstanding among the apparatus displays.

Interesting features of the heavier equipment included: Devices for maintaining energized circuits for automatic regulated frequency; a newly designed portable power unit; a new motor operated, armor-clad switchgear unit and a transformer tap changer for operation under load. There were also a new delayed operation time switch, variable up to three minutes, for use in automatic substations, etc., and a new adjustable interval time switch from one to twenty minutes. One company displayed a complete manhole installation for high-tension service and another company a breaker in which are eliminated the use of A. C. motor mechanisms. The same company had a device which applies entirely new principles to the quenching of the arc in a circuit breaker.

One of the manufacturers devoted space to several new equipment items, including a series capacitor, a motor-operated outdoor disconnecting switch, an oil-filled coupling capacitor, undervoltage device and a non-metallic explosion chamber for oil breakers from 132 to 220 Kv.

Among the newer and partially experimental exhibits were an automatic airport relay, several interesting applications of the photo-electric cell and the transmission of photographs and messages through space by a beam of light.

It is highly significant from the standpoint of the success of the exhibit that the exhibitors at this time were able to display heavy equipment to a much greater extent than formerly, due to the avoidance of the limitation formerly placed upon them in the quarters occupied by previous conventions. No such limitation exists in the new building, and the exhibitors have taken advantage of this situation in a large way.

In the appliance field, the coloring and artistic design of many of the appliances add greatly to the sales appeal. This was not merely an attempt to cater to the esthetic interests of the housewife and to blend with the modern colored kitchen, but undoubtedly carries the inference of superior workmanship and durability as well, when so much attention is paid to external appearance.

Two companies showed for the first time small washers and dryers in one compact unit. An appliance company had vacuum cleaner unit as a substitute for separate attachments. One range manufacturer is showing a new combination coal-electric range and another a wall outlet range with standard size oven. External appearance was emphasized more than ever in the coloring and design not only of small household appliances such as ironing and washing machines, percolators, toasters and beauty specialties, but also in the larger products, such as refrigerators. The larger volume of this domestic equipment shown is indicative of the steady growth in current consumption. A refrigerator, incidentally, was brought to the convention by airplane.

The tendency toward more intensive commercial activities on the part of the central stations of the country, voiced repeatedly from the platforms at the meetings, was reflected in the wide variety of household appliances. The beauty of the entire exhibit was noticeably enhanced by the displays of many companies that featured modern lighting. Signs were blinking, lights were flashing and music from radios and the large orchestra played the accompaniment.

President's Address

(*Continued from page* 335)

for its service, you will see that they almost stand alone as a record of constantly descending prices year by year from its beginning to the present day. And I believe it is true that almost every company in the entire United States during the last 18 to 24 months has revised some of its rates downward, so that its average rates are each year less than they were the year before.

But everywhere, in addition to rendering useful service at a fair rate, these companies and the men and women engaged in them are taking a leading part in the development of their communities. Utility companies are generally regarded in their localities as the most constructive force in the upbuilding and progress of the territories they serve. Locally, they deserve and enjoy almost universal respect and esteem.

The story of the industry, its accomplishments, opportunities, purposes and policies will unfold as the program of the convention proceeds. It is an inspiring story, with new things happening year by year which gives most to its reputation.

Anybody can be president of the National Electric Light Association, if you show him sufficient partiality. He can't go far wrong with such an organization behind him to do the work for him and give him the credit.

I extend to you my very great thanks and appreciation for your partiality and kindness in conferring upon me the distinction of being President of the National Electric Light Association for this year. I shall cherish it always.

Accounting National Section Report

By J. F. Ford

Chairman, Accounting National Section, N.E.L.A.

Presented at the Fifty-second Convention of the National Electric Light Association, held at Atlantic City, N. J., June 3-7, 1929

WE have been passing through one of the most strenuous years in the history of the electric light and power industry. In the many problems which have confronted us I feel that the Accounting Section has not been found wanting, and that we have gallantly and with fortitude met all the demands made upon us from our executives, the regulatory bodies, the Geographic Divisions and the National Association.

There has been marvelous progress in the past few years in our industry, and I feel the Accounting Section is entitled to some credit for keeping pace with all the advancements.

Persistent study and research by the several committees of the Section fully demonstrate that we are not lagging in the constructive and instructive work of the Association. This year, in my work as chairman of the Accounting National Section, I am more convinced than ever as to the importance of the accounting department of a public utility organization.

From the organization of a public utility through consolidations and mergers and all the many ramifications of financing, the accounting department functions as the only recording channel of all its activities, and is the steering wheel which guides the executive in his constructive thinking.

The accounting section must be alert and on its toes continually to meet the constantly changing conditions in the march of progress of the industry.

Debt of Gratitude

This association and the industry at large owe a debt of gratitude to the members of the several committees who have given so much time and energy in the preparation of the reports produced by the Section this year. When men of intelligence and ability, recruited from the national and geographic divisions, give their time and effort and are supported by their company executives, nothing but constructive results must be obtained.

The Accounting Section gives to those who take an active part therein a broader vision and an enthusiasm that is essential in the development of ideas. For this reason alone executives of member companies should encourage and see that members of their staff serve on these committees. Executives are strongly urged to allow their accountants to serve on committees, attend meetings and perform geographic and national association work. It is not only a distinct advantage to each individual company, but a great educator to its accounting staff.

J. F. FORD

Permit me to ask what better means has this great industry of ours for developing and improving its accounting systems than through the medium of the accounting section where the interchange of ideas is a constant source of improvement, which otherwise probably would remain undeveloped.

I have endeavored during my administration to establish a closer cooperation with all the other national sections. I have found that there are an infinite number of questions arising in the Commercial, Engineering and Public Relations sections which need our assistance and we need their assistance, so by closer affiliation we can be of infinite value to each other, to the Association and to the member companies.

The accountant today stands in a different light. He is beginning to be recognized as one of the essential parts of a public utility enterprise. The accountant today tells you where we have been, where we are now and where we are going. The accountants are the compasses by which the executives steer their course toward the harbor of successful results.

It had not been my intention to make any mention of the meetings of the Accounting Section during the year, but I feel that I can point with pride to the two very successful group meetings, at both of which the active interest and enthusiasm displayed by those in attendance were most remarkable. An innovation was adopted at these meetings in the form of general luncheon meetings—something new for the Accounting Section. These meetings were addressed by men prominent in the industry, who gave of their time to leave with those in attendance a message and an inspiration that was helpful to them in their daily tasks.

The serial reports that have been prepared by the various committees are a matter of record. They prove conclusively the valuable research work which has been done and are of unquestionable value to the industry as a whole.

Closer Contact with Other Groups

One of the most outstanding accomplishments of the accounting section in the past few years has been the establishing of a closer contact with the various sections of the Association and the Geographic Divisions and the benefits derived through these closer contacts undoubtedly accrue to the member companies.

I have been connected with the Accounting Section in many capacities for the past ten years and finally reached the goal of chairman of the Accounting National Section. My administration and activities in past years have led me more forcibly to the idea that men in the industry must work up to their opportunities and work faithfully and conscientiously toward this goal, as it is an honor to be classed as a chairman of the National Accounting Section and as past Accounting Chairman. It is an honor to which every accountant should aspire and executives of member companies should assist in seeing that their chief accounting officers have that ambition.

I have endeavored within my regime to meet all the conditions which have confronted this Section, have carefully selected assistants and outlined the work which was expected of them, and in every instance they have not been found wanting. I want now to thank in an humble way my able assistants, vice-chairmen, members-at-large and the chairmen of the several committees for their most loyal support and untiring efforts in making this administration the success it may merit.

In closing my administration as chairman of the Accounting National Section, I want to pass on to my successor that he continue those principles of expansion and development so ably carried on by my predecessors, and which I have tried in my humble way to expand dependent upon them for further expansion and to carry on this good work to a successful and inspiring fruition.

In closing this report I want to express my personal appreciation of the splendid support and hearty cooperation I have received from Headquarters; to Mr. Paul Clapp, who has shown by his personal attendance and talks before this Section his loyal and helpful support and suggestions; to Mr. A. Jackson Marshall, Secretary, who has given us every helpful suggestion and cooperation in our arrangement of meetings and programs; to Mr. Fred W. Herbert, Director of the Accounting Section, that untiring individual who is a stimulus for every chairman to put forth his best efforts and of whom too much cannot be said of his capabilities and willingness to serve, and to President Arkwright, who has devoted his time and energy toward stimulating interest in the Section.

In retiring as Chairman of the Accounting National Section I am not retiring in loyalty and further assistance, and I hope I may long continue as an active member of this Section and give what service, experience and advice I can to help toward further accomplishments.

I have given my time and services most willingly to this work the past year, and if I have given anything constructive I am most grateful, but I feel I have been fully repaid by the experience I have had and the most pleasant acquaintances which I have made. My best wishes for my successor are that he may get the same pleasure out of this work as I have, and I know he will get the same cooperation and assistance which has been accorded me during my administration.

Matthew S. Sloan

MATTHEW S. SLOAN, newly elected President of the National Electric Light Association, is president of five companies which comprise the largest electric light and power system in the world, The New York Edison Company, Brooklyn Edison Company, Inc., The United Electric Light and Power Company, New York and Queens Electric Light and Power Company and The Yonkers Electric Light and Power Company. This group of companies has 30,000 employes and serves a population of 6,443,000 in an area of nearly 700 square miles.

He was born in Mobile, Ala., Sept. 5, 1881, a year before Edison opened the Pearl Street Station in New York City. At nineteen, a graduate from the Alabama Polytechnic Institute, he took his first job in a public service plant in a small town in Alabama.

The next job was as pit man with the Memphis Street Railway Company. Six months later he became connected with the General Electric Company at Schenectady, N. Y., first in the apprenticeship test course and afterward as an outside construction engineer, installing General Electric apparatus for public utility companies.

From 1906 to 1914 Mr. Sloan was associated with the Birmingham Railway, Light and Power Company, first as chief engineer. Two years later he was made general superintendent in charge of engineering and operation, and from 1912 to 1914 was assistant to the president. He became operating manager of the New Orleans Railway and Light Company in 1914 and vice-president and general manager in 1916, holding that office until he came to The New York Edison Company in 1917 as assistant to the vice-president and general manager.

Aug. 1, 1919, he became president of the Brooklyn Edison Company. With the acquisition of the Brooklyn Edison Company by the Consolidated Gas Company, Aug. 28, 1928, Mr. Sloan was made president of The New York Edison Company also. He was elected president of the United Electric Light and Power Company on Sept. 4, 1928, president of the New York and Queens Electric Light and Power Company on Sept. 18, 1928, and president of the Yonkers Electric Light and Power Company on Nov. 12, 1928.

Mr. Sloan is also a director of these companies and is president and director of the Amsterdam Electric Light, Heat and Power Company of Brooklyn, of the Edison Construction Company, and of the Edison Light and Power Installation Company.

He is a trustee of the Consolidated Gas Company of New York, a director of the Bronx Gas and Electric Company, of the Westchester Lighting Company, of the Consolidated Telegraph and Electrical Subway Company, of the Bush Terminal Company, and of the Sloss-Sheffield Steel and Iron Company.

Mr. Sloan's public utility career has been characterized by his interest in the public relations of the utilities. In 1925 he was Chairman of the Public Relations Committee of the National Electric Light Association and with distinguished ability has served the association in other capacities. He is a past president of the Association of Edison Illuminating Companies and of the Empire State Gas and Electric Association.

He is active in civic and professional affairs. He is a director of the Brooklyn Chamber of Commerce, the Chamber of Commerce of the United States, the Coney Island Chamber of Commerce, the Long Island Chamber of Commerce, the American Standards Association, the Fifth Avenue Association, the Brooklyn Bureau of Charities, the National Security League and of the Park Association of New York City, Inc.

Mr. Sloan is trustee and treasurer of the Polytechnic Institute of Brooklyn and of the Long Island University. He is a trustee of the Brooklyn Hospital, of the Young Women's Christian Association and of the Museums of the Peaceful Arts. He is a vice-president and director of the Brooklyn Academy of Music. Mr. Sloan is a member of the American Institute of Electrical Engineers, the New York Electrical Society, the Academy of Political Science, the Merchants Association of New York, the New York Southern Society, the American Red Cross, the National Industries Conference Board, the Chamber of Commerce of the State of New York, and the National Association of Manufacturers. He is a member of the Executive Committee of the Empire State Gas and Electric Association, and an associate member of the Medical Society of the County of Kings.

His election as a director of the Guaranty Trust Company of New York April 18, 1929, connects him with the twelfth financial institution either as director, trustee or member of the advisory board.

Engineering National Section Report

By E. C. STONE

Chairman, Engineering National Section, N.E.L.A.

Presented at the Fifty-second Convention of the National Electric Light Association, held at Atlantic City, N. J., June 3-7, 1929

AN OUTLINE of the activities and findings of the committees of the Engineering National Section was presented in my report to the Section at its session yesterday afternoon.* The report embraced more detail than would be of interest to this general session. At this time I wish to call your attention only to one or two of the matters covered, as follows:

All of the committees of the Engineering National Section have been in active operation during the past season, and have functioned with their usual effectiveness. The objective of "More System Capacity per Dollar of Investment" has been definitely reflected in their work, as is shown in the marked attention given to the development of designs and methods which will make for greater economies.

The increasing interest in this work is shown by comparative analysis of the organization personnel for the administrative years 1927-28 and 1928-29. The number of member organizations participating in the work of the Engineering National Section increased from 201 to 221 or 10 per cent, and the number of individual engineers having membership on the various committees increased from 550 to 630 or 14½ per cent.

"More System Capacity per Dollar of Investment" is emphasized because of the increasingly important part that fixed charges are playing in the total cost of electric power service. With fuel efficiency at its present high level, the cost of generation has become almost a minor item, so that system investment now offers the greatest field of opportunity for further major economies. In the past, attention has been centered on reducing fuel and other operating costs. In the future it will be devoted particularly to economical system design and control of construction costs.

New Committees

The two new committees, Power Systems Engineering and Special Engineering Research, which were organized last fall, have given a good account of themselves in the first year of their existence. The Power Systems Engineering Committee provides for study of the now very important subjects of system planning and design, and rounds out the organization to meet present-day conditions. This Committee has found a very definite, well crystallized, and uniform opinion among those executives who have developed planning organizations in their own companies that comprehensive future planning will bring about important savings in overall investment and operating costs, and therefore offers the definite recommendation that a planning development should be set up in every growing electric power utility.

E. C. STONE

The Special Engineering Research Committee, after making a comprehensive survey of the status of engineering research in the power industry, finds that there exists considerable duplication of effort which is wasteful of time and money, although entirely unavoidable under the circumstances, and concludes that proper coordination of research work in the industry can be best obtained by setting up a paid secretary at headquarters. The duties of such a secretary, who would naturally be placed in the Headquarters Engineering Staff, should be to maintain a complete file on research projects of interest, to arrange for adequate publishing of information regarding results as rapidly as they can be made available, to arrange for the initiation, placing, and financing of new and desirable research projects, and in general, to do all that a staff man can do to coordinate and guide research work so that it will be of maximum use to member companies.

The Executive Committee of the Engineering National Section has approved this recommendation, and it is earnestly hoped that appropriate provision for carrying it out will be made in next year's budget of the Association. The situation in respect to engineering research in the power industry is such as to make the adoption of this recommendation of primary importance.

An important step in standardization was made possible when the Executive Committee of the Engineering National Section approved the report of the Joint Committee of the N. E. M. A. and N. E. L. A. on preferred voltage ratings for alternating current systems and equipment. The adoption of the recommendations of this report generally by member companies will simplify the manufacturers' lines of apparatus, will bring about better adaptation of equipment to its service under prevailing conditions and will generally improve conditions for the interconnection of adjacent power systems. While the recommendations cannot be uniformly adopted at once, it is to be hoped that member companies will direct their system development toward the complete acceptance of the preferred voltage recommendations as soon as practicable.

Engineering Developments

Engineering developments during the past year have been along the line of better understanding of the problems of design and operation, and further refinements in equipment. The major radical development of importance was in the field of circuit interruption, where material advance has been made in the design of high duty circuit breakers not requiring oil. The so-called "Deion" circuit breaker has been successfully tested on a large power system.

Two major problems of power system engineering. system stability and lightning protection, have received much attention during the past year. Increasing interest in these subjects is logical, in view of the constantly increasing importance and volume of the power companies' business. Marked advances have been made toward satisfactory solutions of both of these problems.

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*Editor's Note: June 4th. Progress reports of the Committees referred to have appeared from time to time in the N. E. L. A. Bulletin during the past year.

Considerable public attention has recently been directed toward electrical hazards in the home. This is probably because, while such accidents are very few, they are necessarily spectacular in nature when they do occur. Recent statistics of the National Safety Council, indicate that the chance of a fatal accident in the home from a fall is sixteen times that from electricity. Nevertheless, the Accident Prevention Committee has sensed the need for some sane recognition of this situation and prepared, with the cooperation and approval of the Commercial National Section and other interested parts of the Association, a safety in the home pamphlet under the title of "Common Sense." This pamphlet will be available shortly.

The booklet on "Resuscitation," prepared last year jointly with other interested organizations, has had a circulation unprecedented for N. E. L. A. publications. Including reprints issued by insurance and manufacturing concerns this circulation has reached into the millions. The work of the industry in educating the public in methods of resuscitation is having a very beneficial effect in building public good will.

In recognition of the probable engineering requirements in connection with the intensive load building effort that will be put forth in the next few years, the Utilization Subcommittee was created this year in the Electrical Apparatus Committee to deal with the problems involved in the utilization of electrical energy including the engineering of present applications and the development of new uses. During the past years the Headquarters Staff has cooperated with the Commercial National Section in dealing with problems of wiring, oil burners, and water heating.

The Headquarters Staff

The Headquarters Engineering Staff, under the direction of Major H. S. Bennion, is now very effectively organized, and although undoubtedly undermanned, has given an excellent account of itself during the past year. The engineers of the Staff are at the same time the sentinels and ambassadors of the industry in engineering matters. On the one hand they keep in close contact with the activities of many other organizations whose work may affect our interests and promptly bring to the attention of the proper parties all matters on which action may be required. On the other hand they constitute an official point of contact with outside organizations and provide a channel for effective cooperation in engineering matters. Thus they not only protect the engineering interests of the power industry, but also make possible the cooperation of our industry with others in such a way as to bring about coordinated physical development and general good will. The engineers of Headquarters Staff are doing well a very important work, particularly in the code situation and on the problems of coordinated construction with other utilities. They should receive generous support and be permitted to expand their organization as the growing industry they represent throws additional burdens upon them. For example, last winter in accordance with the recommendation of President Arkwright, company code representatives were designated by many member companies to serve as channels for information to and from Headquarters direct to member companies. The arrangement throws an additional heavy task on Headquarters Staff to maintain this contact, but the records which are being built up as a result of this plan and the solidarity which results from the closer contact is going a long way toward solving the code problem which has been confronting the industry in recent years.

Geographic Divisions

The engineering committees of the Geographic Divisions have made further progress during the past year in finding themselves, and their activities have been more extensive and more effective than heretofore. With the more definite understanding of their purpose and scope, the geographic organizations are being molded to specifically meet the local conditions. While the national organization is being used as a guide, each division is setting up only those committees in which it has a direct interest, while in some instances special committees have been organized to meet special conditions. This is as it should be. Such encouragement and advice as appeared useful has been given by the officers of the National Section to the geographic organizations. The chief recommendation has been maximum simplicity of organization to meet clearly defined local requirements. In the working out of geographic engineering activities, a definite trend has been noted toward the conference form of activity. That is, the various engineering committees of the respective divisions have met together once or twice a year for general conference and exchange of ideas. Definite programs have been prepared in advance with carefully selected and well qualified speakers to cover the subjects set up for discussion. These programs have been advertised in advance. The result has been most gratifying, and indications are that this method of carrying on divisional work will be generally adopted. Very favorable comment must also be made of the valuable serial reports on timely engineering subjects which have been prepared by a number of the divisions. These reports form an important part of the work, but after all must be considered secondary to the major purpose of bringing together the engineers of the various companies for interchange of ideas and discussion of mutual problems.

Standardization

One of the objectives of the Engineering National Section is constructive cooperation in the national movement for standardization. It seems evident that standardization affecting the power industry up to the present time has been generally advantageous, and has resulted both in economy of power production and in extension of power uses. There may, however, be a possibility in our present enthusiasm for standardization of allowing the pendulum to over-swing. The kind of standardization which established frequencies, utilization voltages, ratings of the equipment, factors of safety of equipment, has been a major factor in developing the use of electricity in this country. In the field of simplification, however, which results in a reduction in the capacities of equipment or qualities of material available, the immediate result is a less close adaptation of the available products to the service for which they are to be used. This fact alone means some economic loss. On the other hand, the results of simplification bring about economies, such as reduced costs of manufacture, reduction in stocks to be carried, and so on. It is thus necessary to balance the advantages and disadvantages of a given standardization project of this kind in order to determine its true economic value.

The major purposes of standardization, to effect economies and extend use of product, must be kept in mind in setting up the standardization program. It is suggested that the Engineering National Section during the coming year should give study to the subject of standardization, with a view to determining the lines along which standardization may be prompted to best advantage and wherein overstandardization with economic loss is a possibility.

A report on the work of the Engineering National Section would not be adequate if it did not call attention to the very valuable serial reports which are published from time to time by the various committees of the Section. These reports together constitute a complete, up-to-the minute exposition of the latest and best engineering practices and methods of the electric power industry throughout the country, and are authoritative because they are compiled by the members of the engineering committees,

(*Continued on page* 400)

Convention Impressions

By An Observer

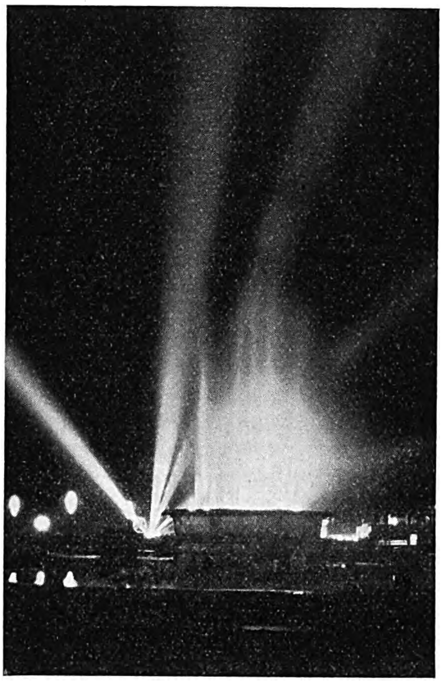
I THOUGHT I had attended conventions. In fact, for some years, I have thought there was little about conventions that I did not know. For a long time I have been quite sure that given a subject and a list of delegates, I could pull off a successful convention anywhere, under any conditions, and in any known language.

And so I approached the 52nd convention of the National Electric Light Association with a distinct feeling of boredom. "I had seen so much of this sort of stuff, you know, and there couldn't possibly be anything new about it."

Now I am back in New York having reached but one definite conclusion. Until June 4, 1929, I "hadn't been nowhere and I hadn't seen nothin'." I am in thorough accord with the oft-repeated statement made by Preston S. Arkwright, that this was not just another convention. It has never been held before and will never be held again—at least, not in the lifetime of those who were present.

INNUMERABLE times during the week the expression "Press Arkwright has certainly had all the breaks," was heard. Personally I am of the belief that Providence must have taken a special interest in him from the time that he was born and knew that he would be elected President of the Association for 1928-29. And because of this special interest Providence caused the incandescent lamp to be perfected by Edison in 1879 so that Light's Golden Jubilee would come during his term of office. Then for the sake of consistency if nothing else, Providence must have inspired former Mayor Bader of Atlantic City to dream his dream of a great Auditorium which would be a monument to this wonderful seashore resort and arranged it so that this dream might come true in 1929. Yes, Press Arkwright may have had all the breaks but it wasn't all just "luck." There is something bigger than luck behind the birth and growth of a great industry which in the short span of fifty years can erect by the side of the road on which it is traveling such a milestone as this convention and I suspect that Arkwright had much to do with the construction of this background.

If I am to make the effort of recording my impressions—and this seems to be what the editor of the N. E. L. A. BULLETIN desires—I must start with Atlantic City's beautiful new convention hall, which was christened by this convention. There may be somewhere in the world a great writer or, perhaps, a great painter who is able to picture the grandeur of this building in such a fashion as to present an adequate picture of it. I confess I am neither that writer nor that painter. No words of mine can ever do it justice. There is nothing like it in the world and it will be many, many years before anything is built for a similar purpose which will surpass it.



Fountain of Light erected in Atlantic City by General Electric Company in celebration of Light's Golden Jubilee

Built of Indiana lime-stone and brick, and stretching for a block along the Boardwalk and back to Pacific Avenue, its magnificence is only equaled by its Gargantuan size. They tell me that the Main Auditorium will seat 41,000 people comfortably, the ballroom 6,000 and that if these two rooms, together with the innumerable committee rooms, are all in use, 66,000 persons will be sitting down and there will be left plenty of room in which to move around. This is more than the entire permanent population of Atlantic City.

They tell me that a thirteen story building, five hundred feet long and 200 feet wide, can be placed in the Main Auditorium, leaving more than a hundred feet on all sides to spare and that if Babe Ruth stood on the stage and knocked the longest home run he has ever made, the ball would fall far short of the other end. Personally I believe it all and a great deal more. The publicity man, one Frank Hartnett, has like all publicity men, been extremely modest. If I had his job the things I could find to say would cause my friends to have me examined by an alienist. But all I would be doing would be telling the truth.

There is one complaint which I have to make about this building and it has to do with the question of geography. The distances are so great that if one makes a mistake he is fairly well sunk. Twice the first day I tried to go from here to there, that is to say, from one set of offices to another, and I finished outdoors with the necessity of going around to the main entrance and starting all over again. I understand that many delegates, plus some very high officials, had the same experience and were somewhat annoyed thereby.

Having paid my respects to the convention hall without in the least trying to describe it, I suppose I should turn to the exhibits which were housed in the Main Auditorium. Reminiscing once more about conventions that I have seen I do not believe that any industry has ever held an annual meeting accompanied by any such exhibit of the goods it has to sell. There were more than 200 of them and they included everything which had to do with the generation, distribution and utilization of electric energy. One could have spent a week profitably looking them over and when he got through he would have had an intensive education in just what this light and power industry means.

BUT to get back to our "mutton and ale" as we say in dear old "Lunnon." The show started off with the inauguration of Light's Golden Jubilee by President Arkwright on Friday night, May 31. This came off according to schedule and was exactly as advertised with a lot of additional fixings. President Arkwright made one of his characteristic speeches, which always lifts his audience on its toes, and then pressed a button as all Presidents do when they are starting something, whether it is a special message to the Congress of the United States or opening a World's Fair. Instantly the Aurora Borealis sprang into being and the Boardwalk, together with the great Boardwalk hotels, which had been dark, were a blaze of lights. The bands played; a cannon roared a salute of 21 guns; everybody cheered; and the international celebration in honor of Thomas A. Edison which will last until October 21, was in full swing. The light and power industry mentally pinned another medal on its retiring president and set about its immediate business which was to have a good time for three days before settling down to the serious purposes of the convention.

It is by no means my intention to give in these columns a formal description of the convention. This will be found on other pages of the BULLETIN. Instead I propose to record a few of the side lights—the sort of thing which is not spot news and, therefore, does not appear in the newspapers, and which but few people have the opportunity of observing in such a way that they can appreciate the mechanics of an affair of this sort. The convention itself I will dismiss with the statement that it lasted for four days and consisted of four general sessions, four national section meetings and innumerable other meetings of national committees and little private gatherings of kindred souls. Nor do I propose to pay much attention to the Big Berthas—the headliners. They got quite enough publicity in the daily newspapers.

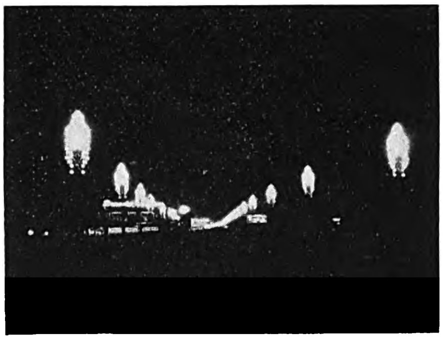
The first item of interest to the individual attending a convention of this kind, with or without his family, is the question of hotel reservations. Now it is something to handle reservations for more than 12,000 people without at least a few mix-ups, and without some folks having a few anxious moments wondering whether or not they are going to sleep on the beach. Yet this seems to be exactly what was done and, as I understand it, by the efficient Miss Woods, of Secretary Marshall's office. At least one heard nothing but compliments on every side.

IT is quite a nice trick to register more than 12,000 people—everyone of whom is in a hurry—in two days, check their pedigrees, see if they are entitled to registration or not, ease them around to the cashier, the philosophical Miss Downey, in order that she may collect tribute, record the hotels in which they are stopping, provide them with badges so that they can get in and out without being arrested for trying to crash the gate, and answer a multitude of questions, ranging all the way from such questions as "do you know whether John Jones is here and where is he stopping, if so?" to the best place to buy a straw hat. Yet 12,000 people passed through the N. E. L. A. registration booth in a little more than two days as easily as a drove of sheep going down a greased shute.

It is not an easy matter to handle space for 216 exhibitors—even when the available space is measured in acres rather than square feet—and make them all happy. Yet this was done through the office of Miss Lisota, assistant secretary of the Exhibition Committee, and she did a great job. Like the convention itself, nothing like this exhibit of the light and power industry has ever been seen before. The decorations and arrangements were quite as remarkable as the exhibits themselves.

The publicity of a great convention is always something of a problem. Some conventions make news and some don't. This convention, fortunately, created an enormous amount of news as witness the amount of space given to it by the daily press. But it is a big job to make this news quickly available sufficiently in advance to have it given a proper play. In this instance a press summary of practically every speech, as well as a running story of every general session and of every Section meeting, was given out to the newspapers in mimeographed form, well in advance, and at the same time, the full text of every speech was given to those who wanted to pay especial attention to some particular subject. The mechanics of this work, which involves an enormous amount of detail, were handled by Miss "Lou" Bioni, called the "City Editor" by the newspaper men, who bossed everybody, including George Oxley himself, as I suspect Miss Woods bosses "Ajax" Marshall, the Secretary of the Association, or as Miss Downey bosses George Francis, the Assistant to the Treasurer, or as Miss Lisota bosses the Exhibition Committee.

In connection with publicity for a convention of this sort it is worthy of note that it takes a real program to make spot news and a large wreath should be handed to everyone who had anything to do with the construction of the program of this particular convention. Putting the full text of all of the speeches, the reports and the statements made together, one has a text book on the light and power industry, such as no single author could ever hope to write. It constitutes at one and the same time a great history, a social and economic philosophy, a religion, if you please, and a declaration of principles and ideals of which any industry might well be proud.



And because such a text book is something so much more than the usual collection of platitudes and bromides, one hears at the average national convention, it is destined to become an outstanding classic among the literature of the light and power industry.

No "impressionistic" story of this convention would be complete without some mention of the movietones which were shown each day during the general sessions. Mr. Edison, although at his home in Florida, was there in person on the screen and addressed the delegates in a strong, vigorous voice. Sir Ernest Benn, the noted British economist and publisher, stood in the garden of his summer home near London and through the medium of a talking film, expressed most emphatically his views on the subject of private ownership and operation, registering opposition to all forms of public ownership. His Excellency, Dr. Alberto Pirelli, President of the International Chamber of Commerce, greeted the convention and paid a graceful tribute to Thomas A. Edison, from his home in Milan, Italy. Sir Kengo Mori, Chairman of the Japanese Committee of Experts to the Reparations Conference in Paris, told about electrical development in Japan and what it means to his country.

PERHAPS the most remarkable thing about the convention was the attendance at the various sessions. A convention in Atlantic City is always a problem—there is so much to do and so much to see. Yet the great ballroom of the convention hall, where the general sessions were held and which seats comfortably 6,000 people, exclusive of the balconies, was filled to over-flowing every day and, what is even more interesting, the people stayed until adjournment, even though the session ran well over luncheon time. I am told that the section meetings were attended in the same way.

It was a serious convention. It was a sober convention. I make this second statement in no spirit of levity. Too many people have the impression that a national convention is only an excuse for a variety of good times. It was not so in this case. These people were there meaning business and to get everything out of the week that they could. As a waiter in the Traymore said to me: "'Deed boss, ah never did see so many big men at a convention. Dey's all bosses and dey means business—dey ain't foolin'."

That waiter voiced the spirit of the convention. This 52nd convention of the National Electric Light Association, held on the occasion of the 50th anniversary of the birth of the practical incandescent lamp, was making history and there wasn't any "foolin'."

Sales Increase or Rate Increase

By M. S. SLOAN

President-Elect, National Electric Light Association

An Address before the Fifty-second Convention of the National Electric Light Association, held at Atlantic City, N. J., June 3-7, 1929

THE title I have chosen for this paper is not intended to indicate an alarmist state of mind. It is intended, however, to call to the attention of our industry facts which seem to me worthy of our careful study. The situation is not at present one which should alarm us. It should not be permitted to get to a point where it does become alarming.

Trends in our industry over a period of several years show that it is slowly being squeezed between the jaws of a pair of pincers.

One jaw is a decline in the kilowatt hour sales and revenue for each dollar of investment.

The other jaw is a rising investment per kilowatt of installed generating capacity.

In spite of this squeezing, our rate of return has lowered only slightly in the period under consideration. The return has thus held up because of a splendid steady increase in operating efficiency produced by our engineers, and economies in financing and other phases of management produced by consolidations and groupings of operating companies. The excellent financial showings the electrical utilities in general are able to make at present are a tribute to technical progressiveness and administrative ability. They must, in time, however, reflect the trends in sales and investment if those are not corrected.

The figures I am using in this paper were collected by the Statistical Department of our Association from its own records, and data of the Census Bureau. They cover the entire electricity supply industry of the country, with inter-company sales eliminated.

In 1922 there were sold 7.54 kilowatt hours for each dollar invested in plant and equipment. In 1927 this figure dropped to 6.61 kilowatt hours, a decrease of 12½ per cent.

The average price per kilowatt hour sold in 1922 was 2.81 cents, while in 1927 it was 2.71 cents, a decrease of 3½ per cent.

The revenue for the dollar of investment in 1922 was 21.1 cents. In 1927 it had decreased to 17.9 cents, or 15 per cent.

The 1922 rate of capital turnover was once in 4.72 years. In 1927 it was once in 5.58 years, or 18 per cent longer.

In this period, from 1922 to 1927, the installed generating capacity increased 78 per cent. The average generation per kilowatt installed increased 4 per cent. The investment per kilowatt installed increased from $312 to $367, or 17½ per cent.

The balance available for interest, dividends and surplus showed an average rate of return for the industry in 1922 of 7.58 per cent. In 1926 it was 7.30 per cent. In 1927 it was 7.48 per cent.

In order that these facts may be seen in their proper relationship, it is necessary to interpret them by the introduction of paralleling facts. As we all know, there have been, in recent years, many rate reductions, particularly in domestic or household rates. As an industry, we take pride in the fact that electricity is the only item in the cost of living figures, compiled by the Federal Government, which is lower now than it was before the World War. That, in part, at least, accounts for the steady decrease in the revenue received for each dollar of investment.

SINCE the War, our industry has carried on a tremendous building program. In the last few years, which have been a period of great business activity, general prosperity and easy money—that is, capital readily available on good terms for enterprises of merit—we have vastly enlarged our plant capacity and transmission and distribution equipment. As an industry, we have invested in such extension each year three-quarters of a billion dollars, or more. We have made up for any deficiencies of construction during the War period, and have built ahead of demand, as it was our duty to do. We have built into less densely populated territory, into the smaller and more remote communities, into rural districts, to reach farm customers wherever practicable. The net result of that has been that cost of transmission and distribution facilities have been heavier in proportion to the unit of energy sold than when we were dealing with large city groups, or even the average of urban population.

This condition will continue. In very large degree, the urban population of the country is now on our lines. Aside from the natural growth of population, the new customers we shall obtain will be those in the outlying districts, so it is not reasonable to suppose that investment costs will turn downward.

Now with those elements taken into consideration, what do our figures show us?

First, the average revenue per kilowatt sold to the ultimate user is just about stabilized. The tendency, however, is downward.

Second, the trend of revenue in relation to the dollar of investment is distinctly downward.

Third, the time of capital turnover is markedly lengthening.

Fourth, the investment per kilowatt of installed generating capacity is increasing.

Fifth, the return on the investment has been approximately stabilized since 1922.

On that showing, the question "Shall we increase our sales or our rates?" becomes distinctly and sharply pertinent.

There can be but one answer to that question. We do not want to seek rate increases. We want to continue the course of our industry's development, which has been marked by a steady decline in prices charged for service. We could not afford to raise the prices now even if we did want to, for such a policy would inevitably decrease our sales and antagonize the public.

The answer to this question then is that we must increase our sales. We must sell more kilowatt hours for each dollar of investment, making our equipment work harder and steadier, and the place to sell more service, in my judgment, is in the home. There are nineteen million homes on our lines. The average use of electricity in these homes is figured at 460 kilowatt hours during 1928. That represents an increase of 30 kilowatt hours over 1927, which year produced an increase of 25 kilowatt hours over 1926. It is gratifying that there were these increases, yet their size really does not seem anything to cheer about.

This figure of 460 kilowatt hours, please remember, is the average for the country. In many districts of the country it is exceeded largely. There are, for example, annual sales of 546 kilowatt hours at an average price of 4.94 cents, of 580 kilowatt hours at 4.52 cents, of 577 kilowatt hours at 4.87

cents, of 717 kilowatt hours at 4.88 cents, and 735 kilowatt hours at 3.3 cents.

It is obviously not likely that every electric utility can equal such sales. It is distinctly possible, however, for most companies so to increase their domestic sales that the average for the country will jump a good deal more than 25 or 30 kilowatt hours a year.

Domestic sales should be vigorously stimulated for several reasons. The first is that they are and always will remain the backbone of our business. Industrial use of electricity, and, to a somewhat less extent, commercial use, will fluctuate with the state of business health of the country. We have seen this in recent years. In 1922 industrial sales were about 6 per cent below the average. In 1926 they were about 6 per cent above.

THERE is very little fluctuation in domestic use of our service. Household habits become fixed. A household accustomed to the convenience and value of electricity will curtail its use only under the direst necessity. When we add to the domestic load, therefore, we put on what amounts to a permanent increase in business.

Another reason is that domestic business is highly desirable business. Once the customer is beyond the point of use, which pays for the fixed expenses of serving him, the chief expense incurred by the company in furnishing additional kilowatt hours is that of generating the energy. Moreover, increased domestic load is an important element in improving the company's load factor.

The third reason is that the customer who makes the largest use of service is, in all human probability, the best satisfied customer. We seek to improve our relations with the public by furnishing information about our business, by public speaking, by advertising.

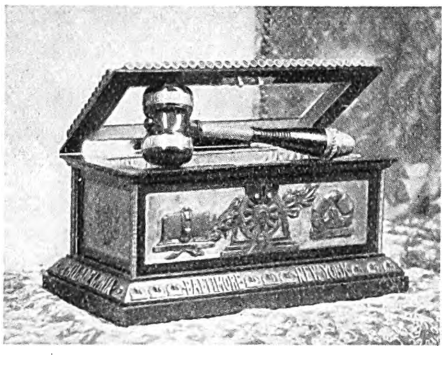
We have every possible incentive to create a body of customers in homes all over the land who are using so much service and getting so much comfort and convenience out of the use of service that they thoroughly and genuinely appreciate its worth.

A fourth reason is that we have a social duty to increase the domestic use of electricity. Electric utilities are not alone business enterprises. They are also organizations for public service. They obtain their franchises on that basis. With them they acquired certain responsibilities. One of these responsibilities, as I see it, is to do everything possible to make their service most widely useful to the public. Naturally, as a matter of plain ordinary business policy, we seek to sell as much service as we can. My point is that we have for sale more than kilowatt hours. We have for sale comfort, convenience, time saving and freedom from drudgery. We have for sale better home conditions, higher standards of living.

IT is our privilege and duty to approach our sales problem from that point of view as well as from the point of view of increasing our revenues. If we neglect it, we may be sound business organizations but we fail to live up to our responsibilities as public utilities. Our industry has been criticized not a little on just that point, and I think we deserve the criticism in exactly the measure in which we omit any effort, practices or policies, which may properly be adopted to make electric service more used and more useful in the home.

It seems to me more than a coincidence that in every case I know of a reduction in domestic electric rates has been followed by increased use of service. There may be instances where this was not true, but they have not come to my attention. It was true in Brooklyn under conditions which covered a series of reductions over a period of several years. It has been true in up-state New York, in New England, in the Middle West, and on the Pacific Coast. Those companies which show the highest annual domestic sales also show the lowest rates. We have, therefore, in the experience of our industry what may be accepted as a guiding principle in stimulation of sales of service for domestic use. The way to increase such sales is wisely and properly to lower the domestic rates.

Moreover, there is within the experience of the industry in recent years a guide to the general form of rate schedule effective in increasing domestic sales rapidly, what has come to be known as the inducement rate. In this there is either a minimum charge or a charge for the first few kilowatt hours at sufficient rate to cover the fixed charges of serving the customer, after which comes a kilowatt hour charge lowering rapidly as the use of service increases.



The Historic President's Gavel of the Association. Presented in 1888 to the Association's First President, Frank W. Morrison.

You are all familiar with the theory itself, whatever its variations in rate structures for particular localities. This theory works. Such a rate schedule actually does what the name indicates. It induces larger sales of kilowatt hours, and that, it appears to me, is what we are all after.

For a number of years we have been patting ourselves on the back over the million and a half new homes brought on our lines each year. In truth, the figures have represented a high tribute to the value of electric service and have been something about which we might properly be gratified. Yet, having obtained these customers, we have not been doing our full duty to our companies in respect of them, neither have we been doing our full duty to them. We have not been selling these customers all the electric service they could profitably use in the various processes of running a modern household.

Here with our nineteen million domestic customers is a field to cultivate which will yield us, properly cultivated, more sales to the dollar of investment without adding to that investment; which will increase the average revenue to the dollar of investment, even on lowered rates; which will tend to shorten the time of capital turnover; which will produce a practically permanent increase of sales not subject to the fluctuations due to business depression. These advantages we stand to gain, plus the great and valuable advantage of having this enormous body of customers better satisfied with our service because it is doing more for them.

HERE is a situation, it seems to me, which concerns all companies in our industry, because, however well any may be doing in respect of domestic sales, none has reached the limit of possibility. Indeed, who can tell what the limit is when Mr. Edison himself says that electricity will not have done its full job as long as humanity uses for any tasks some agency which electric service could better. Obviously each company will have to meet this situation according to its own local conditions and in its own time and manner. Each company, however, will have to meet it. Our nation's standards of living do not stand still. They are constantly being revised upward. Society's demands upon our industry do not stand still. They also are constantly being revised, and on the whole I believe in no unfair spirit.

Clearly, the demand now is for a way of making possible more use of electric service in the American home. That demand coincides with our need as an industry, and there is within the industry the experience and general indication of how to meet it with mutual benefit.

Prize Awards Made at the Convention

THE El Paso Electric Company, El Paso, Tex., was awarded the Charles A. Coffin gold medal at the Public Policy Session for having made during the past year the most distinguished contribution to the development of the electric light and power industry for the convenience of the public and the benefit of the industry. In addition to the coveted honor and the gold medal, the El Paso Electric Company receives a cash prize of $1,000 for the company employee benefit fund.

Kilowatt-Hour Contest

Nine thousand dollars was awarded to six winners in the Commercial Section Kilowatt-Hour Contest at the Wednesday afternoon session of the N. E. L. A. on June 5. Three first prizes of $2,000 each were awarded, and three second prizes of $1,000 each.

The contest was participated in by sales departments of class A companies, the prize being for the largest increase in total average annual kilowatt-hour consumption per residence customer, with the objective of attracting attention to the possibilities of increasing domestic use of electricity.

The contest was divided into three classes, based on the total average consumption of each company for the year 1927. Class A was for companies with an average of 451 kw-hr. or over. The first prize was won by the Cheney (Wash.) Light & Power Company, which developed an average increase from 491 to 686; the second prize by the San Joaquin Light & Power Corporation, Fresno, Cal., for an increase from 625 to 724.

Class B embraced companies with an annual consumption for 1927 from 351 to 450. The first prize was won by the Alabama Power Company, Birmingham, on an increase from 433 to 496; the second prize by the Western Public Service Company, Scotts Bluff, Neb., on an increase from 387 to 449.

Class C was for companies with a 1927 average of 350 kw-hr. or under. The first prize was won by the Central Power & Light Company, San Antonio, Tex., for an increase from 256 to 415; the second prize by the Western Public Service Company, Beaumont, Tex., with an increase of 264 to 367.

The following honorable mentions were given: Class A, Portland (Ore.) Electric Power Company with an increase of 93; Class B, Durham (N. C.-Public Service Company with an increase of 58, and the Southern Colorado Power Company, Pueblo, with an increase of 54; Class C, Annapolis & Chesapeake Bay Power Company with an increase of 100; Montana-Dakota Power Company, Minneapolis, with an increase of 84.

Federal Electric Prize

The Federal Electric Company prize of $1,000 for electrical advertising went to the Edison Illuminating Company of Boston.

Forbes Cup

The Forbes public service cup for 1929 was awarded to the Puget Sound Power and Light Company for the most distinguished work in the field of public relations.

N. E. L. A. Prize Awards

The prizes which have been offered annually by various donors for the best papers on subjects relating to the electric light and power industry were awarded this year as follows:

H. L. Doherty Gold Medal

"Investment Merit of the Electric Utility Industry." Everett W. Vilett, Public Service Electric & Gas Company, Newark, N. J.

Harriet Billings Award

"The Human Side of a Balance Sheet." P. O. Johnson, Northern States Power Company, Minneapolis, Minn.

Martin J. Insull Award

"A Public Relations Yardstick." Rob Roy MacLeod, Buffalo, Niagara & Eastern Power Corporation, Buffalo, N. Y.

James H. McGraw Awards

1. "Operating a Hydro-Electric System for Best Economy." E. B. Strowger, Niagara Falls Power Company, Niagara Falls, N. Y.
2. "The Electric Water Heater." H. George D. Nutting, Detroit Edison Company, Detroit, Mich.
3. "Peak Load in Steam Plants and Its Economical Generation." Francis Heisler, Public Service Company of Northern Illinois, Chicago.

J. E. Davidson Awards

1. "A Study of Merchandise Advertising." Keo Currie and Ray Warren, Public Service Company of Northern Illinois, Chicago.
2. "Specialized Merchandising for the Central Station." Donald D. Parry, Central Hudson Gas & Electric Corporation, Poughkeepsie, N. Y.
3. "Winter Humidity and Comfortable Homes." Edwin Fleischmann, Niagara Falls Power Company, Niagara Falls, N. Y.

H. M. Byllesby Awards

1. "Six Words in an Accountant's Life," by William A. O'Neill. Electric Bond & Share Co., New York, N. Y.
2. "How to Increase the Usefulness of the Accountant in the Public Utility Industry," by F. L. Barry, Electric Bond & Share Co., New York, N. Y.
3. "The Accountant in the Public Utility Industry," by Harold V. Bright, Southeastern Power & Light Co., New York, N. Y.

Frank W. Smith Educational Award

Raymond H. Young, Public Service Electric & Gas Company, Camden, N. J.

Coffin Award

Marked reduction in investment per dollar of gross revenue, increase in average load of domestic customers, development of lighting load, increased service reliability, exceptional over-all plant efficiency, excellent customer and employee relations, a wonderful safety record, and development of rural service are the major achievements which won for the El Paso (Texas) Electric Company the "Charles A. Coffin Award" for 1929.

The territory served by this company embraces El Paso, Texas (600 miles distant from any city of equal size), Juarez, Mexico, and the rural region extending 120 miles up and down the Rio Grande Valley. The population served is 148,160, about 50 per cent of which is Mexican. There was an 8 per cent increase in population during 1928.

The achievements on which the award were based are summarized below:

Investment Per Dollar Gross Revenue

$3.47 in 1928, $3.59 in 1927—a 3.3 per cent increase in earning power.

Average Load of Domestic Customers

6.9 per cent increase, despite 7.5 per cent gain in new customers; 30 per cent increase in merchandise sales; district representative plan increases per capita sales 200 per cent.

Lighting Load

Illuminating engineers made important additions to street lighting, electric signs, lighting of outdoor sports, aviation field illumination, as well as window and building lighting.

Reliability of Service

Greatly improved by rehabilitation of isolated plants acquired, extensions and improvement, centralized dispatching, reorganization of trouble department, double feeder lines to important customers, radio communication, automatic signal systems.

Over-all Efficiency

Over-all efficiency of power plant increased 2.4 per cent and cost of net kilowatt-hours delivered reduced 8.28 per cent.

Customer and Employee Relations

Better service slips and letters from customers show great improvement in relations. Actively participate in all civic enterprises. Affording every opportunity for self-improvement and advancement has developed loyal, efficient, courteous employees.

Safety Record

With 205,000 man-hours devoted to distribution work and autos traveling 366,000 miles, lost-time accidents have been reduced to surprisingly small amount. Regular safety meetings and demonstrations.

Rural Service

With faith in future company has made large investments to render service. Long-line extensions made to encourage irrigation and reclamation of waste land, with subsequent increase in population and added loads. Numerous farms, dairies, cotton gin and oil mills.

Light's Golden Jubilee

By PRESTON S. ARKWRIGHT

President, National Electric Light Association

An address made at the Dedication Ceremonies opening the Atlantic City Auditorium, May 31, 1929

THIS is the inaugural of Light's Golden Jubilee.

All over the world, during the year, will be celebrated the fiftieth anniversary of the invention of the electric incandescent lamp, which was first successfully demonstrated by Thomas A. Edison, its inventor, at Menlo Park, N. J., on Oct. 21, 1879.

With its coming the terrors of the dark were banished; useful time lengthened; available space widened; waste reduced; efficiency increased, and the safety, convenience, comfort, happiness and usefulness of mankind enlarged.

It is the only artificial light without flame. It sends its beams out steadily in the gale and shines brightly in the closet. It leaves the air unpolluted, with its life-giving elements undespoiled and its temperature practically unaffected. It is a rose without a thorn. Evil shuns it, and goodness and purity flower in its glow.

Wherever available—and that means almost everywhere—electric light is now the universal artificial illuminant. So useful a need did the electric incandescent lamp fill that two and one-half billion of its fellows are in use today.

But vastly improved are they—in appearance, in ruggedness, in longevity, in economy, in efficiency and in adaptability for varied uses. The improvement in the lamp, combined with the wonderful development of the electric industry following in its wake, has brought such great reduction in its price that its enjoyment is now within the reach of any pocketbook. It is the cheapest light the world has ever had. It is one hundred times cheaper than candle light, many times cheaper than oil light, and it costs less today than ever before. The cost of the one candle on the baby's first birthday cake is many times more than the cost of lighting with electricity the whole dining room for the party. Indeed, electric light actually costs less than natural light inside the house. Natural light in the great outdoors is free, but it costs money to bring it in behind the walls. Not only is it cheaper, but electric light is better than daylight. Daylight is timid about entering the room, and hovers around the windows. Electric light will penetrate the farthest corners and shine with undiminished brightness wherever you want it.

The idea of the lamp in Edison's brain, or the experimental model in his laboratory, would serve no useful purpose. It must be made available for general use. So Edison invented, organized and established the first electric central station.

Thus, out of the lamp has come the electrical industry, serving at first a limited area in the most congested section of our largest city, and growing by leaps and bounds through the short years, until we now have electric central stations with their long-distance transmission and interconnected systems, supplying house-to-house electric service for lighting, heating and power purposes to over 23,000,000 customers in the United States alone, distributed the country over in practically every city, town and hamlet, and rapidly spreading to the farms.

Niagara Falls Golden Jubilee Celebration

Bathed in a glow of golden light, Niagara Falls will play host to a crowd of visitors estimated at 100,000 from June 13 to 16, when the first civic celebration of Light's Golden Jubilee, following the National Electric Light Association Convention, will be staged.

The celebration will be the more impressive because it is coincidental with the marking of three other anniversaries—the Fifth Annual International Festival of Lights, the 50th Anniversary of the first generation of electricity from the waters of Niagara and the 250th Anniversary of the discovery of Niagara Falls by the white man.

All the street lights on the main thoroughfares at the city of Niagara Falls, N. Y., will be changed from white to golden hue.

Scores of retail business places will be decorated to show in contrast the lighting effects of 50 years ago and those of today.

Improved lighting, golden in color, will be applied to gasoline-service stations and similar places.

The Queen Victoria Park Commission, through W. D'Arcy Ryan of the General Electric Company, is arranging for an aerial drill and golden effects to be produced by the 24 immense searchlamps which illumine the Falls nightly.

The General Electric Company will transfer its broadcasting program over WEAF on Saturday, June 15, to Niagara Falls.

Almost every day brings new applications of the service—new devices to take the place of human drudgery, to lighten and brighten the work of living, to multiply the output of the factory and the earnings of the workman, and to take away the physical tasks of the home.

No wonder that all over the world the fiftieth anniversary of the birth of the electric incandescent lamp is celebrated. The celebration consists primarily in merely giving opportunity for the light to show forth itself. Tonight, here in Atlantic City, is a Festival of Light. In full brilliancy, in all the colors of the rainbow, it will spray the heavens, scintillate on the waves of the ocean and cast its splendor on the earth.

The place and the time are the perfection of appropriateness. Germinated in the brain of a citizen of New Jersey, and brought to fruition on its soil, the electric incandescent lamp cast its first ray into the air of this State.

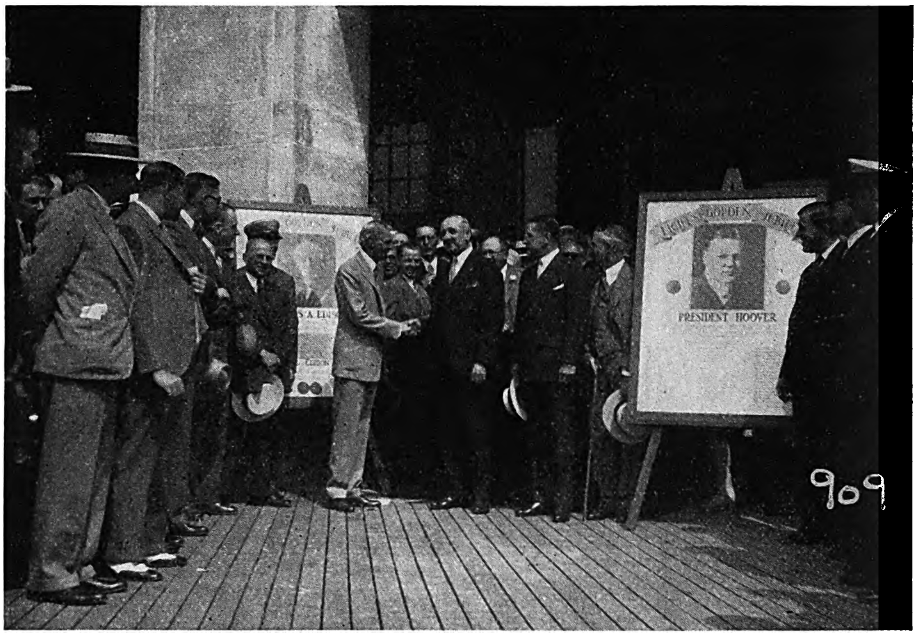
A large proportion of these lamps now in use are manufactured within and by the workmen of this State.

Within the State is a place of national restoration where tired bodies are restored to vigor, dulled brains are made alert again, and despondent souls are filled with new enthusiasm. From Atlantic City men go back to perform the tasks of the world better and more happily. Along its shore the sun shines brighter, the air is purer and more invigorating. Atlantic City, like the electric lamp, lightens men's tasks, brightens men's lives, makes men's services more efficient and more useful.

The time coincides with the convention of the association of the electric light and power industry, from which men go out with new inspiration, carrying the benefits of electric light and electric service over expanding areas to more and more people with greater advantages and at more economical cost.

The aeroplane, high in the sky, is lost in the darkness. Its siren wails in distress. Instantly, without intervention of human hands or direction by human mind, the electric lamps interpret the call and respond to the need with a flood of light to point the way. The spectacle of the lights begins and their radiance will make the Heavens declare the glory of God and the firmament show His handiwork.

Light's Golden Jubilee Arouses the Nation's Interest



HENRY FORD BORROWS TWO CENTS

Henry Ford had to borrow two cents when he bought the Thomas A. Edison commemorative stamp at a special post office set up at the Atlantic City Auditorium June 6th. Behind the counter, flanked on either side with pictures of Edison, was Postmaster Perkins. As he handed to Mr. Ford the first stamp to be sold here, the motor magnate searched in vain through his pockets for two cents. J. F. Quinlan, Executive Secretary of Light's Golden Jubilee, came to the rescue with the necessary coppers. "Thanks," said Mr. Ford, taking the change. "I'll see that you get it back."

In the photograph, taken at the special postoffice in the Convention Hall, are, to the right, Mr. Ford, M. L. Eidners, Superintendent of Division of Stamps; J. F. Quinlan, Executive Secretary, Light's Golden Jubilee; M. S. Sloan, New York Edison Co., and G. C. Osborn, General Sales Manager, Edison Lamp Works.

THE opening celebration of Light's Golden Jubilee was so happily mingled and blended with the whole of the N. E. L. A. Convention it would be both impossible and undesirable to draw a line of demarcation.

Although one day was set aside as Edison Day, when special homage was paid to the Father of the Industry by speakers and audience, the tributes to Mr. Edison ran, as it was said, like a theme in a musical composition throughout the whole convention.

Without question, the Edison Pioneers, the sponsors of Light's Golden Jubilee, have the whole-hearted support of the electrical industry and, moreover, the entire country appears to be eager to participate in the Jubilee, which reaches its grand climax on Oct. 21, the anniversary of the perfection of the first practical incandescent lamp. In the meantime, the U. S. Government has set its mark of approbation on the Jubilee by issuing special postage stamps bearing an engraving of the original lamp. Niagara Falls is having, this month, a festival of light which is expected to attract 100,000 visitors, and from now until the 21st of October practically every city, town and hamlet will in some fitting way pay public honor to the great inventor.

The Plan Book for Light's Golden Jubilee has been prepared and will shortly be distributed by this Association to member companies. The Plan Book will give detailed suggestions for the holding of local celebrations, from the handling of the preliminary publicity to the completion of the celebration.

The placing on sale June 5 of the commemorative stamps at Menlo Park, N. J., which village has the distinction of being the birthplace of the original Edison lamp, drew thousands of persons from all over the United States eager to purchase the stamps in the town where Edison labored for so many years on his marvelous inventions.

The stamps were put on sale as soon as Postmaster Shepherd opened the doors, where a line had begun forming before 7 o'clock. There were stamp collectors from near and far—one from Arizona in a ten-gallon hat, another from California. Some 400,000 stamps were sold during the day—from a post office that ordinarily sells about thirty. In the first fifteen minutes stamp collectors had ordered more than 250,000.

The first stamp of the issue of 180,000,000 was placed on a letter from Postmaster General Walter F. Brown to J. F. Quinlan, Executive Secretary of Light's Golden Jubilee. The letter to Mr. Quinlan read:

"My Dear Mr. Quinlan:

"This letter is posted at Menlo Park on the first day of sale of the Edison Commemorative Stamp. The stamp on the envelope is the first one issued to the public.

"In this connection I take pleasure in commenting on the patience and industry which you have shown in the worthwhile task of commemorating Mr. Edison's notable achievement."

The first piece of mail that went out was a specially bound blue morocco album, lined with blue silk and bearing the first impression of the Edison stamp. It was sent by air mail to Mr. Edison at Fort Myers, Fla., with this inscription:

"This, the first impression of a special postage stamp issued by the Post Office Department of the United States of America in commemoration of the fiftieth anniversary of the perfection of the incandescent lamp by Thomas A. Edison, is presented to him in evidence of the department's appreciation of his contribution to the welfare of mankind."

The stamps were placed on sale at a special post office in front of the Convention Hall at Atlantic City on June 6, and many thousand were purchased by the convention delegates and the townspeople.

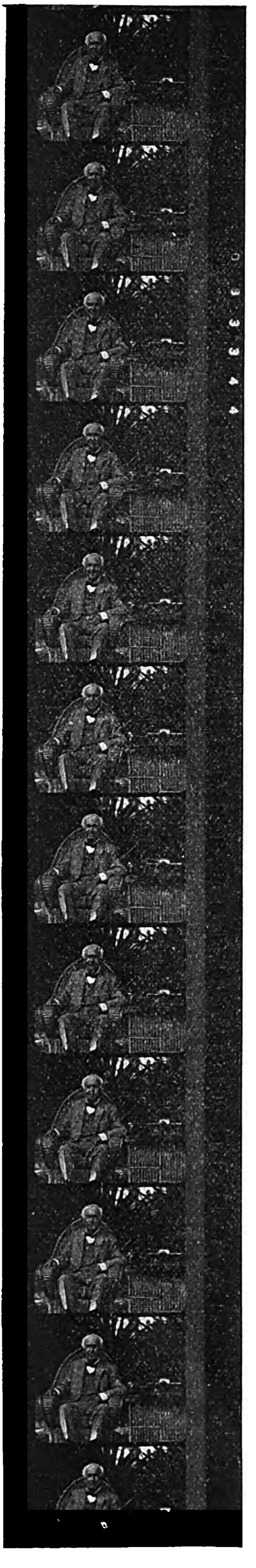
Among the many interesting things to be brought out in connection with the Jubilee are replicas of the original lamp.

Thousands of these approximate replicas of the great inventor's pioneer lamp are now being manufactured by the leading lamp makers of the country for distribution to electrical dealers, central stations, electric leagues and others throughout the land.

This lamp, though quaint, will burn, and is to be used as part of countless window and counter displays calling the world's attention to the fact that this is the fiftieth anniversary of Edison's history-making discovery, and that Light's Golden Jubilee, celebrating the occasion, is everybody's opportunity to participate in a world-wide expression of gratitude to the greatest inventor of all time.

It is expected that this facsimile, so unlike the modern inside-frosted lamp of today, will arouse no end of curiosity in the public mind.

Movietone to Carry Convention to All Parts of the Country



FOR the first time in the history of conventions an annual get-together meeting of a great national industry has been recorded in the form of a talking motion picture film. The film is now being wrapped up, put into cans, and shortly will be ready to ship around the country in order that those who could not get there may see and hear the 52nd Convention of the National Electric Light Association.

It was a big idea, and the interesting feature about it is that it has never been done before. It all started with a private showing of movie talking films of such men as Sir Ernest Benn, the noted English economist; Dr. Alberto Pirelli, President of the International Chamber of Commerce; Sir Kengo Mori, Chairman of the Japanese Delegation to the Reparations Conference, and last, but to the light and power industry most important of all, Thomas A. Edison. It was impossible for these men to be present at the convention, so they sent their greetings and their thoughts as to the future by means of a movietone taken at their homes.

Someone suggested that if persons of importance could be brought to the convention in this manner the convention itself could be taken about the country in exactly the same way to those who were not so fortunate as to be able to attend it. No sooner said than done. Arrangements were immediately made with the Fox Case Corporation to move a crew and the necessary equipment to Atlantic City. From the time Preston S. Arkwright, President of the National Electric Light Association, stepped out on the balcony of the Auditorium on the evening of May 31st to inaugurate Light's Golden Jubilee, until the election of Matthew S. Sloan as President for the coming year, every important event was "shot" by the camera and sound men.

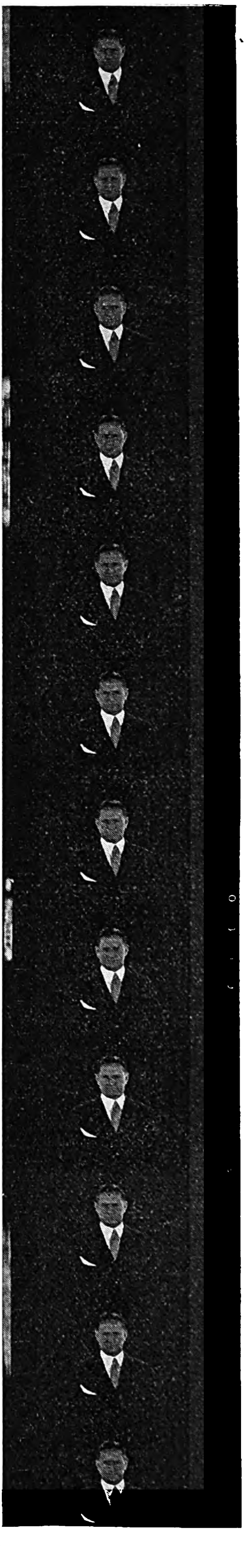
Included in this film will be not only pictures of the convention itself, but close-ups of leaders of the industry delivering their speeches, pictures of the exhibits accompanied by band music, pictures of extra-convention events, and the talking-movies of the various personages who addressed the convention through this medium.

At an early date this film, or any portion of it, will be available for conventions of Geographic Divisions, various section and committee meetings, gatherings of employees' associations—in fact, for any sort of affair attended by those interested in seeing and hearing the greatest convention ever held by the N. E. L. A. It has already been booked for a number of such showings.

Perhaps the most interesting section of the whole film is that which shows Mr. Edison at his summer home in Florida. He is seated comfortably in a great arm chair and talks to the audience as though it were seated around him. He discusses briefly his early visions and struggles, compliments the light and power industry on the progress it has made and expresses his pride in the fact that he was able to play a part in the development of electricity.

Paul S. Clapp, managing director of the N. E. L. A., in a convention address, said:

"The introduction of the talking-moving picture has provided us with a new instrument rich in possibilities. We are undertaking something this year which has never been tried by any national convention. We are making a talking-movie film of the whole convention and exhibit. A staff of expert talking moving picture operators is here under the direction of a leading moving picture director. This film will be finished next week. Within ten days after the close of the Convention it will be shown at Breezy Point, Minn. (North Central Division Convention), then in succession at Del Monte, Cal. (Pacific Coast Division Convention), and Seattle, Wash. (Northwest Division Convention.) Thus we hope to translate to the thousands back home something of the inspiration and benefits of this great Convention which you are privileged personally to enjoy.



Considering Certain Obligations

By AMPLIFIER

DURING the past year, certain portions of the daily press and an occasional periodical have been printing articles purporting to tell how the electric light and power industry have been seriously engaged in "poisoning the wells of education," subsidizing colleges and universities, seducing professors and others charged with the training of the young, censoring text books in use in the public schools and injecting into curriculæ everywhere highly improper material designed to influence both teacher and pupil with regard to the advantages of private initiative over government ownership and operation.

It is quite true—and there seems to be no occasion to deny it—that the industry has taken a great interest in all sorts of educational institutions and in the things which are being taught in them. It has its national committee on cooperation with these institutions and has contributed to some of them various sums of money; when solicited by them, rather than on its own initiative. It has, from time to time, engaged college professors, presumably authorities in their respective lines, to do certain work for it. It has examined text books for the purpose of finding out just what the authors were teaching with regard to the industry itself. It has distributed, in large numbers, pamphlets setting forth the romantic history and astonishing development of the industry.

ALL of this is a matter of public record, and there has never been any secret about it. Under the circumstances which have surrounded the procedure it would have been impossible otherwise. It would therefore seem that it only remains to find out why the industry has done these things; whether or not there are two sides to the picture or the story. Certainly they were not done without reason and it may very well be that there was nothing sinister about that reason.

I have dealt with the question of the so-called "school pamphlets," or extra-curriculæ material, in a previous article. In this I attempted to draw the line between proper and improper material intended for use in schools. In my opinion such material, to be proper, must fit in with modern educational tendencies; must avoid any discussion of a particular political creed, social philosophy, or industrial policy; must be confined to statements of fact and avoid opinions and editorials; and, above all, must fill some specific need. Material of any other sort is improper. The existence of any or all of the qualifications can be easily determined by an examination of the material itself, with the possible exception of the actual need for it. It is this in which I am most interested at the moment.

IN connection with any consideration of the need for the sort of material which is being constantly distributed by the National Electric Light Association as the representative organization of the industry there also arises the question of obligation. What does a great national industry owe to the American public—which buys its product—in the way of detailed and accurate information as to its business, its history, its services and its manner of operation? Should it respond to requests for this information or should it sit back with an attitude of "it's none of your business," thereby saving itself a lot of time, trouble and expense? To answer such a question it is necessary to first find out if there is any such demand insofar as the light and power industry is concerned.

With something of this sort in mind I obtained permission to examine some of the files of the National Electric Light Association, the same files which were willingly thrown open to the microscopic search of investigators of the Federal Trade Commission, I found a great mass of letters from public school teachers and officials, college instructors and professors, librarians and other folks connected with educational work. Because of the general tenor of these letters it is my purpose to quote some of them, deleting the names of the institutions and the writers, but assuring the readers of this article that they are actually in the possession of the Association.

The first one that comes to my attention is from an assistant professor in economics of a large university located somewhere in the State of Pennsylvania. He says: "One of the officers in the General Electric Company sent me a copy of 'The Romance of Power.' I enjoyed it so much that I am writing for twenty copies for a class in beginning economics which I now teach in the .... Branch of the University of .... The course is for enigneering students; a group that should be very much interested in the contents of this pamphlet. If copies are immediately available I will assign the material as outside reading and give all or a part of one class-room period to a discussion of its contents."

Now, "The Romance of Power" cost a lot of money to produce. How should the National Electric Light Association reply to this letter? Should it say "we are not interested in your engineering students," or "we will send the copies you request on receipt of your check for so many dollars," or should it contribute this obviously desired material as a part of its obligation to American education? It seems a simple enough question to answer, yet there are those who would say that such a contribution constitutes a questionable attempt to inject propaganda into this university.

HERE is another from a well-known college for teachers. It reads: "I am certainly indebted to you for your kindness in sending me the four pamphlets, six copies of each. They are certainly excellent material for chemistry and physics classes. They are so good that I am making bold to ask for some additional copies of those on electricity, electric railways and the telephone—enough if possible to place one in the hands of each student to use as a supplementary text, to be returned when the unit is completed."

This letter, which is signed by a professor in the Science Department, refers to the same school pamphlets which have had such large distribution in public schools throughout the United States. If they are as black as some of the enemies of the light and power industry have painted them it would seem that this professor is sadly out of place and should be summarily dismissed.

A letter from the Librarian of the Engineer School Library, Army War College, War Department, is interesting. I give the name of the institution here because it belongs to the people of the United States and its records are public property. He says: "In response to your favor of the 7th inst., we shall be very grateful to you if you will keep our Library on your mailing list, so that we may receive your Proceedings as issued. Your publications are greatly appreciated and constantly used by our instructors and student-officers in their research work."

The "Proceedings" is among the most expensive publications issued by the National Electric Light Association. It constitutes a complete record of the history of the industry for the current year. Shall the Association say that it has no interest in the instructors and student-officers of the Army War College? Shall it demand that the Treasurer of the United States function before material requested is sent? Or shall it keep this particular library on its mailing list?

But the War Department is not the only branch of the United States Government which has been guilty of approving of the material sent out by the National Electric Light Association. We find the Librarian of the United States Naval Academy in the same category as the Librarian at the Army War College. He says: "Replying to your circular letter of the 7th, let me ask that you keep the library on your mailing list. Your publications are very welcome and suitable here, and please accept for the Association the Library's gratefulness for those you have sent previously."

Returning to educational institutions, we find a letter from the Professor of Electrical Engineering, College of Technology, of a New England State University. He says: "You will be interested to learn that we are using the Proceedings now on hand in connection with term papers which are required of our Senior students in Electrical Engineering. We find the information given in these Proceedings very valuable, and wish to continue to receive them by all means." This is indeed serious. The material sent out by the N. E. L. A. is actually a part of the *required* work to be done by these students about to find their places in the outside world.

THE professor of electrical engineering in a Southern polytechnic institute makes an inquiry. After saying that he regards the Proceedings "as of great value as books of reference," he continues: "I understand that N. E. L. A. has published a bulletin on the subject of corrosion and pitting of the runners of hydraulic turbines. Just now we are very much interested in this subject and are undertaking some experimental work to clear up, if possible, the cause of this phenomenon in the runners of the turbines of one of the utility companies in the State. I would appreciate it very much if you would have any literature which you may have available covering this subject sent to me."

Here we have an educational institution actually attempting to solve a problem for one of the light and power companies and asking the help of the industry in solving that problem. What is the obligation of the N. E. L. A. in this instance? It has a vast store of data on all sorts of engineering subjects, the result of much research and expenditure of money. Shall it make it available or shall it keep it stored in its files and on its shelves, refusing to help an institution that is trying to help a company which may or may not be one of its own members?

I could go on indefinitely quoting from such letters as these until I had written more than one book. A Middle Western university writes: "We find the contents of this volume exceedingly valuable in our teaching and reference work." From a university up in Canada comes: "These proceedings are of great value both to the teaching staff and to the students of our engineering courses and I desire to express on behalf of the engineering faculty our appreciation of *the public service rendered by the N. E. L. A.* in sending us these publications for our library." It is signed by the Dean of the Faculty of Engineering and Architecture; the italics are mine. Down in Virginia the educators "always find your publications of great value and interest as reference works and by all means we shall desire to continue to receive this material as long as it is being distributed." Up in New York State a great university asks that all material be sent to a certain professor "who desires to have these valuable volumes housed where they will be permanently available and cared for."

OUT on the Pacific Coast the director of a large public library expresses the opinion that "your Reports and Proceedings are of great value to this library." From Indiana comes the statement that "I cannot imagine that a time will ever come when we would not want to have your publications on file." An institution in New Brunswick hastens "to write you to say that our department of physics and electricity finds these reports exceptionally valuable and makes constant use of them." Out in Utah the Proceedings are "of great value both in connection with class work and for general reference." Oklahoma wishes "to thank you for this wonderful collection of interesting and instructive information."

As I say, I could go on multiplying these quotations indefinitely. The general tenor is always the same. The material sent is of the greatest value in educational work; please "keep us on your mailing list." The only question is: "Has the industry any obligation to continue this sort of cooperation?" It is for its critics and the educational institutions themselves to answer.

With regard to financial contributions to colleges and universities there seems to be a very obvious reason for them. The light and power industry is constantly in search of men, and particularly of men who are college graduates, for all sorts of positions. Its constant complaint is of the difficulty in securing in sufficient number the right sort of men with the right sort of education. But, says our college or university, "we have hardly enough money for the work we have already undertaken. We would like to install courses in public service operation and management and will gladly do so if you will furnish the money until we can make such a department self supporting." Why not? Why shouldn't the industry which is going to employ the graduates from these courses assist in financing them? Many industries and individual industrial leaders have endowed chairs in this or that subject in one or more educational institutions. What possible objection can there be to similar endowments by the light and power industry when it means a supply of the kind of man power it needs?

Furthermore, hasn't it a very distinct obligation to do so? It seems to me that every great public service, dependent as they are all are on the public for support, should devote a little of its earnings to American education, even though there may be some little selfishness in the motive; in this instance the need for university trained men. And it must not be forgotten that this financial aid has been *solicited*.

IT is true that the light and power industry has employed college professors to do specific things for it and probably has received good value for its money. But these things have had nothing to do with the attitude of this or that professor toward the industry or private ownership and operation vs. government ownership and operation. In one outstanding instance the professor was employed to make a survey of courses in public utility management and operation in various colleges and universities, and to report his observations as to how the industry might best cooperate with these institutions in installing such courses. Here, again, we find the motivating force is the need for universty trained men, as well as the moral obligation to be as helpful as possible to those institutions wishing to install departments of this kind.

As to the examination of text-books, I may say that I have delved into a hundred or more of them and have found many, many instances where the text, insofar as the public services are concerned, is obsolete, inaccurate, provincial and in some few instances downright socialistic. Every citizen, every parent-teacher organization, every trade association or Chamber of Commerce, and every industry has a right to inquire as to what children are being taught in the

(*Continued on page* 400)

Behind the Veil

An Artist, a Queen, and a Court Physician

By ERNEST GREENWOOD

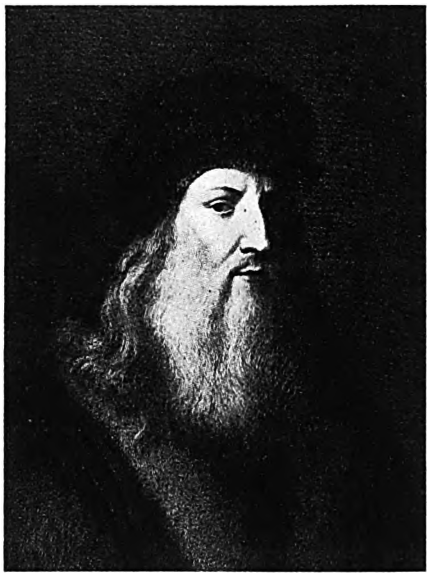
The third of a series of articles under the general title of "Behind the Veil" which will portray against a social-historic background, the evolution of the electrical industry and the chief personalities that have been instrumental in its growth

IN his fascinating book "From Myth to Reason," Woodbridge Riley describes the progress of man's mind as a "drama in five acts." The first act is the Age of Myth, "when men believed that nature was ruled by rival gods, with the world as their playground." While toward the end of this act an attempt is made to reduce these gods to forces of nature, the same motive carries over into the second act which may be called the Age of Magic. Men had a terror of the forces of nature and filled the world with monsters. This state of mind obtained during the Dark Ages and lasted until toward the end of the Middle Ages when it was discovered that "the ocean was not filled with grotesque beasts and that strange and terrible men did not inhabit the remote parts of the earth."

In the third act comes the "rebirth of knowledge" when the scientific discoveries of the ancient Greeks were revived and the workings of the universe were reduced to natural forces. This act may be limited roughly to what has been mistakenly called the "Renaissance," although, as I stated in the preceding article, "history cannot be fenced off by specific dates." Furthermore, we cannot say that during this period there was a "rebirth" in the sense of a sudden beginning. As Parsons tells us, "it was preceded by the great and pulsing era that built the Gothic cathedrals, an age of youth and swift growth, clearly the product of the times. The Renaissance was equally an evolution from the centuries that immediately preceded it, save that it drew one additional source of inspiration across 2000 years of time."

THE fourth act might be called the Age of Mechanics when the world was looked upon as a machine. The fifth great act is the Age of Evolution, when the world is discovered to be alive; a living machine, which completes the drama.

The Middle Ages were declining by 1300. The fourteenth and the fifteenth centuries can be considered as a transition period to be classed either with what had gone before or with what followed, and containing elements of both. There was a movement which is usually called the "Revival of Learning," as John W. Lieb tells us, "with its new conceptions of philosophy and religion; its dedication to new types in the arts; its casting aside of astrology, alchemy and the black arts for the natural sciences; its manifold inventions and discoveries; and its changed political systems." Many important events quickened the stream of history or changed its course. Among there were: the Reformation and Counter-Reformation; the discovery of America; the triumph of Nationalism; the beginnings of modern science; and the three great inventions—the mariner's compass, gunpowder and paper and printing from movable type. At the same time the classical works of Greece and Rome in their influence on science, literature and the arts were rescued from oblivion. The Renaissance itself can be said to have had its beginnings in the latter half of the Fifteenth Century.



From a self portrait

LEONARDO DA VINCI

The outstanding figure of this period—perhaps the most unique figure in history—was Leonardo da Vinci (1452-1519). Mr. Lieb, in his "Philosophy of Invention," tells us that "among the learned professions that of engineering is looked upon generally as a calling in which the notable and the characteristic qualities of the philosopher, of the poet, or of the artist are conspicuously absent. It is considered to be so utilitarian, if not indeed mechanistic, in its aims and accomplishments, with such pressure for immediate achievement that little time remains for dedication to the finer things of life, such as cultivation of the fine arts or pursuit of belles lettres." Mr. Lieb himself, who is senior vice-president of the New York Edison Company and whose reputation as an engineer is international, shows, by his own writings, how fallacious such a conception may be.

AND so it is interesting to note that Leonardo da Vinci, whom most persons think of only as the great painter who produced "The Last Supper" at Milan and the "Mona Lisa" of the Louvre, turned his attention, in part at least, from art to science, engineering and inventions during the end of the fifteenth and the beginning of the sixteenth centuries. He may easily be regarded as the first engineer of modern times and his name enters into the history of countless scientific topics from capillary attraction to flying machines. He has been called "the world's most universal genius" and "the most complete man of all times." He was "artist and scientist, as well as an engineer of ability, musician, poet and philosopher. Strong, handsome, and kind—he could break a horse-shoe with his hands and would buy caged birds to set them free." He gave the first correct explanation of the partial illumination of the darker part of the moon's disc by reflection from the earth and called mechanics "the paradise of the mathematical sciences, because through it one first gains the fruit of these sciences." He denied the possibility of perpetual motion saying, "force is the cause of motion and motion the cause of force."

Leonardo was a keen searcher after the cause and reasons for the things he saw about him, and his greatest delight was in discovering the fundamental laws underlying natural and physical phenomena. He was continuously endeavoring to express the facts and manifestations of nature in terms of what he called a "regola"—a general rule of law. His notes are full of such expressions as these: Try this; observe that; note the effects of this; go tomorrow and ask Maestro Antonio how mortars are placed on bastions by day or by night. He says "I remind you that you confirm your statements and your conclusions through examples and not assertions, which would be too easy. You should say: "Proven by experiment"! There is hardly a department of human knowledge which he did not touch upon and to which his notes do not make some pertinent reference.

IN concluding his address on "Leonardo da Vinci, Natural Philosopher and Engineer," given before the Franklin Institute, Jan. 19, 1921, Mr. Lieb said: "It has not been possible in the necessarily condensed form of this address, to more than give a very general outline, a mere sketch, of the immense field or thought, of research and of constructive detail over which the activities of this extraordinary genius extended, involving, as it does, natural philosophy, physics, chemistry, mathematics, geometry, geology, botany, biology, anatomy and physiology, the plastic and graphic arts, civil, military, mechanical and hydraulic engineering, and last, but not least of all aviation." Speaking of Leonardo's work in the field of artificial flight Mr. Lieb says: "In no other direction has he shown such a combination of the extraordinary powers he possessed of scientific research, acute observation and mechanical ingenuity. Without the internal combustion motor we have today, aviation would be just about where he left it, with the possible exception of the work done on gliders by Chanute and Lilienthal."

The invention of paper and printing ranks in importance with the invention of the alphabet by the Egyptians. Paper antedated printing. Although the ancient world—the Egyptians, Greeks and Romans—used papyrus and the Middle Ages used parchment made from skins, the Chinese had made paper several centuries before the Christian era. In the eighth century A. D. several Chinese paper makers were captured by the Arabs who forced them to work at their trade. Eventually paper making was introduced into Spain by the Moors in the twelfth century becoming common in Europe by the fourteenth century. Gutenberg printed his first page from movable types at Mayence, in Germany, about 1450, to be followed by Caxton in London in 1474, the famous Aldine Press in Venice, 1494, and the Plantin House in Antwerp in 1549. By 1500, thousands of books had been printed. And yet, again, it has been claimed that the Chinese invented printing at a time when "gentlemen in Great Britain were beating one another over the head with spiked clubs."

What has printing to do with the foundations of modern science? In the preceding article the question was raised as to whether a great invention is summoned by necessity or whether it creates the era which it serves. Parsons argues that in the case of printing the need preceded the event. Yet in a previous statement he seems to argue against this very thing. The Greeks knew nothing of printing. They had only manuscripts copied painfully on rolls of papyrus. Yet "they wrote some of the greatest pieces of literature, they created a great architecture and sculpture, and they developed an extraordinary number of fine minds, some of them probably as great as any the world has ever seen. Plainly printing was not essential to genius or an intellectual aristocracy. The high achievements of the Middle Ages were equally without the benefit of printing. The flowering of religious faith and the great cathedrals it produced were not aided by printed books. Neither were the legal system and the empire of Rome. Literature, art, intellectual power, religious faith, organization—what was left for printing to foster?"

QUEEN ELIZABETH

From a painting in the Library of Oxford University

The answer is obvious — democracy of government and the mind, and science. The former would have been impossible and the latter long delayed without printing, providing, as it did, a vastly improved means of communication. Yet neither was the product of the Renaissance but rather of the eighteenth century. However, modern invention rests on modern science which in turn would have been indefinitely postponed without the swift interchange of ideas by means of print. Movable type has been fundamental to the cause of civilization but, in my opinion, has contributed largely to the creation of the era which it has served so faithfully rather than having been itself created by necessity.

The history of electricity is generally supposed to be largely confined to the last two centuries, yet if we consult books written by authors drawing their information from manuscripts written hundreds of years before the invention of printing, we find that Thales noted the phenomena 600 years before Christ. Certainly, the loadstone was known to antiquity as a stone having the power of attracting and carrying a load of iron—a principle to be found today in the great electro-magnets which will lift and transport tons of metal. However, it is when the student of history tries to uncover the earliest date on which its directive property was first recognized and used for guidance on land or sea that he becomes discouraged.

I HAVE said the mariner's compass was invented during the period of the fourteenth and fifteenth centuries. Technically speaking, this is like saying that Edison invented the principle of obtaining illumination by rendering a body incandescent with an electric current when, in 1879, he succeeded in devising a practical incandescent lamp and a practical system of distribution which would make it commercially available. The facts are that "incandescent lighting" can be traced back to at least 1820, and perhaps, if we had the patience, it could be traced back much further than this. In 1840 Sir William Robert Grove gave a lecture before the Royal Society and demonstrated his new battery "by lighting the auditorium with incandescent electric light." It remained for Edison to take the principle and invent the lamp which laid the foundation to the light and power industry as we know it today. This, however, is another story.

So it is with the mariner's compass and its directive properties. Turning back a few thousand years we can find this sort of record as set down in The Bibliographical History of Electricity and Magnetism, by Paul F. Mottelay: "It is related that, during this sixty-first year of the reign of Hoang-ti (2637 B. C.) the Emperor's troops, who were pursuing the rebellious Prince Tcheyeou (Tchi-yeou), lost their way, as well as the course of the wind, and likewise the sight of their enemy, during the heavy fogs prevailing in the plains of Tchou-lou. Seeing which, Hoang-ti constructed a chariot upon which stood erect a prominent female figure which indicated the four cardinal points, and which always turned to the south, whatever might be the direction taken by the chariot. Thus he succeeded in capturing the rebellious prince, who was put to death." Hoang-ti (Hoang, Supreme King) is said to have been third in the "Period of the Five Emperors" and regarded as the founder of the Chinese Empire. He is supposed to have died at the ripe old age of 121, after reigning 100 years. Some historians say that upon his chariot stood a needle, to denote the four parts of the world. This would indicate the use of a compass or something similar to it.

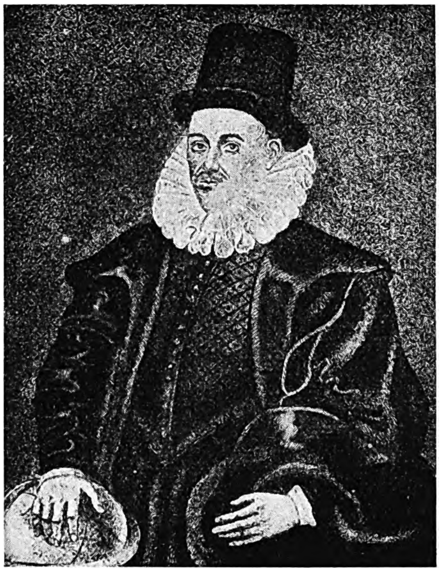
SKIPPING the next 1500 years we find that in 1110 B.C., Tcheou-Koung, Chinese Minister of State under both Von-Vang, first governor of the Tcheou dynasty, and Tsching-Vang, the second emperor) is said to have taught the use of the needle compass to the envoys from Youa-tchang. "As the ambassadors sent from Cochin China and Tonquin (Humboldt, 'Cosmos,' Vol. V, page 51) were about to take their departure, Tcheou-Koung gave them an instrument which, upon one side, always turned toward the north, and on the opposite side to the south, the better to direct them upon their homeward voyage. This instrument was called *tchi-nan* (chariot of the south), and it is still the name given to the compass, which leads to the belief that Tcheou-Koung invented the latter." In his chapter on "The Magnetic Needle," Humboldt says the apparatus was called *fse-nan* (indicator of the south).

Skipping another five or six hundred years to Homer, called the father of Greek poetry, we are told by Mottelay that he "relates that the loadstone was used by the Greeks to direct navigation at the time of the siege of Troy. The latter construction has been placed upon several passages in Homer, the most important being found in Book VIII of the "Odyssey"." As this appears to Mottelay to be "the first attributed allusion to the compass," he gives several interpretations from the original Greek. Among these are:

In won'drous ships, self-mov'd, instinct with mind;
No helm secures their course, no pilot guides;
Like man intelligent they plough the tides
* * * * * *
Though clouds and darkness veil the encumber'd sky,
Fearless through darkness and through clouds they fly.

ALEXANDER POPE,
The Odyssey of Homer, London, 1818.

The earliest reference to the mariner's compass in Christian Europe is said to be in a poem by Guyot, of Provence, dated 1190 A. D., while references to it are also made in works of the thirteenth century. One of these is interesting. It says: "No master mariner dares to use it lest he should be suspected a magician; nor would the sailors venture to go to sea under the command of a man using an instrument which so much appeared to be under the influence of the powers below." The "Age of Magic" was still with the world.



WILLIAM GILBERT

Engraved from a painting said to be the only one of Dr. Gilbert in existence

And lest we be inclined to sneer at the superstition of these times, it might be well to remember that belief in magic, and more particularly belief in witchcraft, is still with us. Furthermore, it is by no means confined to such groups as were recently brought to trial in York, Pa., which was simply a demonstration of the superstition of a few weak-minded and ignorant countrymen involving a hangover from days when such beliefs were held by the wise and learned. "More startling and much more serious," we are told by Dr. Edwin Slosson, Director of Science Service, "is the recrudescence among educated moderns of such superstitions after they have become virtually extinct, except for backwater and submerged sections." His statement, which appeared recently in *Collier's,* is given in full to show how men's minds, even in these enlightened days of modern scientific thought, cling to the inherited beliefs of primitive man.

"Newspapers publishing clarion editorials for clearing out superstition by compulsory education run daily horoscopes in the same issue. Astrology was laughed at by the educated Greeks and Romans, but we see astrological birthday books on our newsstands, and one of the charges made against the governor of Oklahoma was that he signed bills according to the dictates of the zodiac.

"In the Pennsylvania trials no effort was made by the lawyers to prove the reality of witchcraft, but only a few years ago, in a similar French trial, the plaintiff in which had been beaten up by those who thought he had bewitched them, evidence was admitted in court to prove that it was possible to injure or kill persons at a distance in the good old-fashioned way of sticking pins into their wax images. In support of this, experiments by French psychologists were adduced and backed by photographic exhibits.

"A few years ago I took a trip in a motor boat with a colporteur who was distributing the literature of his denomination, mixed with secular periodicals to make it more palatable, among the sailors in New York harbor. His engine stalled on the way, and he could not find anything material the matter with it. But he explained to me that such accidents were not infrequent with him, for the 'malicious magnetism' of the enemy sects caused much trouble with his motor.

"TALKING once in a mid-west city on this topic, and being a bit carried away by the occasion I ventured on the rash prophecy that: 'The general atmosphere is becoming so foggy with superstition that I expect to see witches once more in America before I die.' I thought as I said it that I was giving myself a long life, but you can't go back and erase a word when you are on the platform. When the question was opened for discussion, a lady arose in the balcony and said she was a witch. She offered to prove it by telling me how old I was, but I declined on the ground that I knew that only too well and did not care to have other people know it.

"In the nineteenth century we were expected to outgrow fairy stories at the age of ten, but in the twentieth we are urged to believe in fairies, not merely by Peter Pan, but by Sir Conan Doyle, who publishes photographs of them.

"A conspicuous indication of the restoration to respectability of a belief in witchcraft is shown by its appearance in two prominent scientific and historical collections of the times. In The Outline of Science, edited by Prof. J. Arthur Thomson of Aberdeen, one of the sections is given over to Psychic Science, by the distinguished physicist, Sir Oliver Lodge. The book is intended to present accepted modern science to the unscientific reader, but there is no intimation that this chapter is not as substantially supported and as completely accredited as any other, and in the eleven works that Sir Oliver recommends for reading there is not one on the other side of the question.

"The other work I refer to is that imposing series, The History of Civilization, edited by C. K. Ogden of Cambridge University and Harry Elmer Barnes of Smith College. This will comprise some 200 volumes and purports 'to present in an accessible form the results of modern research and modern scholarship.' So it is surprising to find two learned volumes devoted to witchcraft by a believer in its reality. In the History of Witchcraft and Demonology, the author, Rev. Montague Summers, argues that magic divination, demoniac possession and witchcraft cannot be denied by anyone who accepts the truth of the Christian revelation. And in his Geography of Witchcraft he says: "That a coven of witches existed in Salem is proved beyond all question." So the Oxford divine and the York yokels meet on a common ground of credulity. There are cycles in beliefs, as in modes and manners. The flapper, with a cigarette in her mouth as she flies along the highway through the mountains in her auto, passes a log cabin where sits the crone smoking a corncob pipe. Yet between the two smokers were two generations of women who disdained the touch of tobacco. So, too, witchcraft is coming into fashion again after a lapse of 200 years."

SEDGEWICK and Tyler think it is probable "the compass was first made commonly useful to western Europe early in the fourteenth century by Flavio Gioja, a native of Amalfi, a small port near Naples in Italy, who first poised the needle on a pivot instead of a card floating on water." Parsons thinks it may have been developed either by the Italians or the Scandinavians from the thirteenth to the fifteenth centuries. Again, he claims that it is "a clear case of great human events waiting upon the invention of a tiny piece of apparatus, a bobbing needle in a box." Again, I say that the compass created an era of exploration and discovery rather than having been called into existence by the need for it. The discovery of America, for example, changed the whole history of the world, but the voyage of Columbus was not necessary to human existence, nor, in fact, to the development of culture.

Dr. William Gilbert (1540-1603) is generally accredited with being the founder of magnetic and electric science. He was a true scientific experimenter, and considering the time in which he lived must be regarded as a prodigy of originality. He showed conclusively that the behavior of the compass was due to the fact that the earth itself is a great magnet. For two thousand years—from the days of Thales—it had been supposed that amber alone would attract other bodies upon being rubbed; Gilbert found that many other bodies could be thus excited, such as glass, sulphur and resin. His experiments and reasoning were sound, and he devised a hypothesis of "electric effluvia" which was helpful to electric science for a long time.

DR. GILBERT was a physician at the Court of Queen Elizabeth, a difficult time and a difficult assignment for anyone given to scientific contemplation. Elizabeth's ancestral history was bad. Her father was King Henry the Eighth, who solved his domestic and political problems by the simple device of the axe and block. He had six wives, of whom two were beheaded (this method of disposition being somewhat simpler than divorce), one was divorced by methods quite as simple as those of Soviet Russia, one was sent home and two died. Her mother was Anne Boleyn, who persuaded Henry to "divorce" his first wife so that he might marry her, and who lost her head for no apparent reason other than being guilty of the crimes of being a lawful consort and of bearing a mere daughter—Elizabeth.

It was during the era of Elizabeth and Shakespeare that saw the eclipse of parliamentary and popular rights and the rise of absolutism in England, as in France. The Queen had been preceded by Edward VI, son of Henry by Jane Seymour, his third wife, and Mary (sometimes known as bloody Mary because of the execution of 300 Protestants during her drive to restore Roman Catholicism), daughter of Henry by his first wife. While some historians speak of Queen Elizabeth as an "able and patriotic ruler" and her reign as covering "one of the most glorious periods of English history," she does not present an altogether pleasant picture, and serving her must have been accompanied by a considerable distress of mind. Like the River Forth and a certain type of modern politician, she "pursued a wandering, uncertain path."

About the time Gilbert was serving as a court physician, Dr. Ruy Lopez, a Portuguese Jew who had been driven from his own country by the Inquisition, became physician-in-chief to the queen; the highest place in his profession. One of the greatest fears of sovereigns in those days was the fear of being poisoned. Due to the efforts of the Earl of Essex, a great court favorite, Lopez was accused of conspiring to poison the queen and convicted, although apparently on evidence which was manufactured. He was hung and, after the quaint custom of the day, cut down before he was dead and horribly mutilated while still alive. Essex himself eventually lost his head when the queen grew tired of him; she had a habit of disposing of favorites in the same naive manner as her father disposed of wives—with the axe.

And so life at court as a servant of this temperamental lady who held in her hand the absolute power of life and death could not have been conducive to quiet philosophical or scientific study. In spite of this, however, history tells us that Gilbert's work "is one of the finest examples of inductive philosophy that has ever been presented to the world." His *De Magnete* stands as almost the only important contribution to our knowledge of electricity and magnetism until about 1730, although Von Guericke, following suggestions of Gilbert, made a rude electric machine which he described in a work published in 1672, and had observed the electric spark, which, with his machine, was so small as to be seen only in the dark and to be heard with difficulty.

"DE MAGNETE," which was published in 1600, represents more than 17 years of study and experiment and is dedicated by the author "alone to the true philosophers, ingenuous minds, who not only in books but in things themselves look for knowledge." It is sub-divided into six books which treat respectively of the loadstone, of magnetic movements, of direction, of variation, of declination, and of the great magnet, the earth of circular movement.

After giving an account of ancient and modern writings on the loadstone, and indicating exactly what it is, Book I concludes with the announcement that loadstone and iron ore are the same, that iron is obtained from both, like other metals from their ores, and that all magnetic properties exist, though weaker, both in smelted iron and in iron ore; furthermore, that the terrestrial globe is magnetic and is a loadstone; and that just as in our hands the loadstone possesses all the primary powers (forces) of the earth, so the earth, by reason of the same potencies, lies ever in the same direction throughout the universe.

Book II contains Gilbert's electrical work and is supposed to be the earliest work ever published on electricity. In it the author explains what he calls his *versorium*—a rotating needle electriscope—and gives the results of his many experimental observations together with the opinions of others relative to magnetic attraction. This chapter contains the first systematic study of amber, a list of electrics and recognition of a group of non-electrics. He reaches the conclusion that "all bodies are attracted by electrics, save those which are afire or flaming or extremely rarefied," and that "an ordinary piece of amber does not attract by heat, even when brought to the flaming point, but it attracts by friction, without which latter few bodies give out their true natural electric emanation and effluvium." He differentiates between magnetic and electrical attraction by saying that "the loadstone, though susceptible of very high polish, has not the electric attraction. The force does not come through the luster proceeding from the rubbed and polished electric." He ends the chapter with the explanation that all magnetic bodies come together by their joint forces (mutual strength); electric bodies attract the electric only, and the body attracted undergoes no modification through its own native force, but is drawn freely under impulsion in the ratio of its matter (composition). He says that the matter of the earth's globe is brought together and held together by itself electrically. The earth's globe is directed and revolves magnetically; it both coheres, and, to the end it may be solid, it is, in its interior fast joined.

The Reverend William Whewell in his "History of the Inductive Sciences," says that in the *De Magnete* are contained "all the fundamental facts of the science, so fully examined, indeed, that even at this day, we have little to add to them." Dr. John Davy in his Memoirs of Sir Humphrey Davy says: "Gilbert's work is worthy of being studied, and I am surprised that an English edition (translation) of it has never been published." In 1893 nearly two hundred years after the publication of *De Magnete* in Latin, John Wiley and Sons published an English translation by Paul Fleury Mottelay.

No comment on this work of Gilbert's work would be complete without some note of the reproach thrown upon it by Sir Francis Bacon who also was a servant of Queen Elizabeth. In his *De Augmentis Scientarium* he observes: "Gilbert has attempted to raise a general system upon the magnet, endeavoring to build a ship out of materials not sufficient to make the rowing pins of a boat." But Bacon, although spoken of by many as the "greatest of English philosophers and philosophical writers," was a product of the political atmosphere which surrounded the Elizabethan court. Like the Queen herself, or like the Earl of Essex, or like so many others with whom she surrounded herself, he does not present a pleasant picture. Like some successful "Statesmen" of our own day he was a complete hypocrite and his tremendous intellectual attainments cannot sufficiently excuse his sneering allusions to the work of others quite his equal in mental development. It would be much like sneering at Mr. Edison because the Mazda lamp of today is such an improvement over the carbon lamp of 1879.

I HAVE said that Gilbert's work stands as almost the only important contribution to our knowledge of electricity and magnetism until about 1730, although Von Guericke, who followed his suggestions, published a work in 1672. In 1660 (some historians have placed the date as 1650 but the later date is probably correct) Otto von Guericke, a burgomaster of Magdeburg, Prussian Saxony, constructed the first frictional electric machine. It consisted of a globe of sulphur, cast in a glass sphere, and mounted upon a revolving axis. When rubbed by a cloth pressed against it by hand, it emitted both sound and light. It has been said that it was Guericke who "heard the first sound and saw the first light in artificially excited electricity." By placing a linen thread in contact with this globe he made the important discovery that, just as Gilbert found that magnetism passes from one end of an iron rod to the other, the electric attraction appeared at the distant end of the thread. Thus was established the principle that electric attraction could be "conducted" and made evident at a point distant from its source. In this primitive laboratory at Magdeburg, therefore, the "electrical transmission of energy" is supposed to have been born.

There is always something dramatic about comparisons. The chariot of ancient times with the automobile of today; the stage coach with the Twentieth Century Limited; the Indian canoe with the Leviathan; the balloon in which Montgolfier made an ascent in 1783 with the Graf Zeppelin; the first telegraph line, which ran from Baltimore to Washington, with the radio; Trevithick's locomotive of 1804 and the great electric giants of today pulling undreamed of loads with ease. But there is scarcely a historical comparison more dramatic than this bit of thread in Guericke's laboratory with a great 200,000 volt transmission line, built high in the air, and carrying enough electrical energy to light hundreds of thousands of homes, turn the wheels of innumerable factories, operate thousands of miles of electric railroads and street railways, and furnish power for almost every conceivable kind of activity. The principle discovered by Guericke is at the very foundation of our present day social, economic and industrial standards.

Bibliographical note of acknowledgement: "The Philosophy of Invention" and "Leonardo da Vinci, Natural Philosopher and Engineer," by John W. Lieb; "Bibliographical History of Electricity and Magnetism," by Paul Fleury Mottelay; "De Magnete," by William Gilbert, translation by P. F. Mottelay; "The Stream of History," by Geoffrey Parsons; "A Short History of Science," by Sedgewick and Tyler; "Elizabeth and Essex," by Lytton Strachey; "Henry the Eighth," by Francis Hackett; "From Myth to Reason," by Woodbridge Riley; "History of the Inductive Sciences," by Reverend William Whewell; "Memoirs of Sir Humphrey Davy," by John Davy; Handbook of the National Electric Light Association (Chapter I).

Public Relations National Section Session

(*Continued from page* 332)

lem, he asserted, they certainly can accomplish much.

At this meeting, B. C. Forbes announced that, for thorough and enterprising work in public relations, conspicuous energy in the development of rural business, successful load building in the face of municipal competition, harmonious architecture in plants and substations, effective use of radio broadcasting, friendly service to its customer and businesslike administration, the Forbes public service cup for 1929 had been awarded to the Puget Sound Power & Light Company.

An interesting feature was an address on "The Part Electricity Can Play in Better Home Management" by Miss Lita Bane, past president of the American Home Economic Association. She said that while there may be a limited demand for specialties of some kinds, women seem to agree that they would like to see the major efforts of electric service in the home directed to devising power machinery to take care of the time-consuming, heavy, frequently recurring, likely-to-be-monotonous tasks. It seems probable, also, that the home may regain some of its former prestige as a center of recreation for the family and small groups of friends. Electricity is making a direct contribution to this situation through the radio and electrically operated musical instruments and, indirectly, by making the house more comfortable and convenient for the entertainment of guests. It will undoubtedly make even larger contributions in the future.

Some of Miss Bane's suggestions to the industry were:

1. To produce and sell electrical service as cheaply as possible.
2. To study carefully the needs of home managers in order that money and effort may not be wasted in producing useless tools.
3. To produce electrically driven machinery which shall be as simple and as cheap as it is possible to make it.
4. To offer women careful training in the use, care and simple repair of household equipment. It is suggested that women are particularly successful in this work of helping to overcome their sex's prejudice regarding "machinery."
5. That care be exercised in putting into a home only suitable and needed equipment which its budget can carry without undue worry and strain.
6. One special need emphasized was the need of the farm home where in many instances an undue, almost an unfair, amount of manual work has still to be done by the housewife.

Nation-wide Food Preservation Campaign to Be Promoted by N.E.L.A. with Other Associations Cooperating

TEACHING the millions that 50 degrees is the danger line on the thermometer for the proper preservation of perishable food is the object of a nationwide program now being rapidly organized by the National Electric Light Associaion in cooperation with a score or more of other national trade associations and the public utility companies of the country.

The Commercial National Section of the N. E. L. A., at the suggestion of the Refrigeration Committee, has taken this as its principal promotional activity next fall. The movement will be known as the National Food Preservation Program. It will be centered, so far as public attention is concerned, in the month of September, although preliminary work will be going on actively throughout the summer.

The fundamental purpose of the whole program will be to impress on the American public these four major ideas:

1. The relationship between food spoilage and health.
2. To establish in the public mind a perishable food temperature of 50 degrees or less.
3. The cause of food decay and bacteria growth.
4. The vital need for proper all-year refrigeration.

Every avenue of advertising and promotion, national and local, will be employed to focus public attention on the benefits to health and the economy of proper refrigeration all the year round. Dominant advertising in national magazines will be the primary instrument. Newspaper advertising and radio broadcasting will add to the effect of the magazines. Magazine and newspaper articles by recognized authorities on the necessity for proper care of food to preserve health have been arranged. Addresses before community gatherings and complete local tie-up with the program by all the factors interested in public health and in the merchandising of refrigeration and of perishable foods have been planned.

The month of September was selected for the program for two principal reasons:

First, because it offers an opportunity to emphasize to the American public the need for proper refrigeration all the year.

Second, because it will stimulate sales at a time when there has been a tendency to relax selling effort.

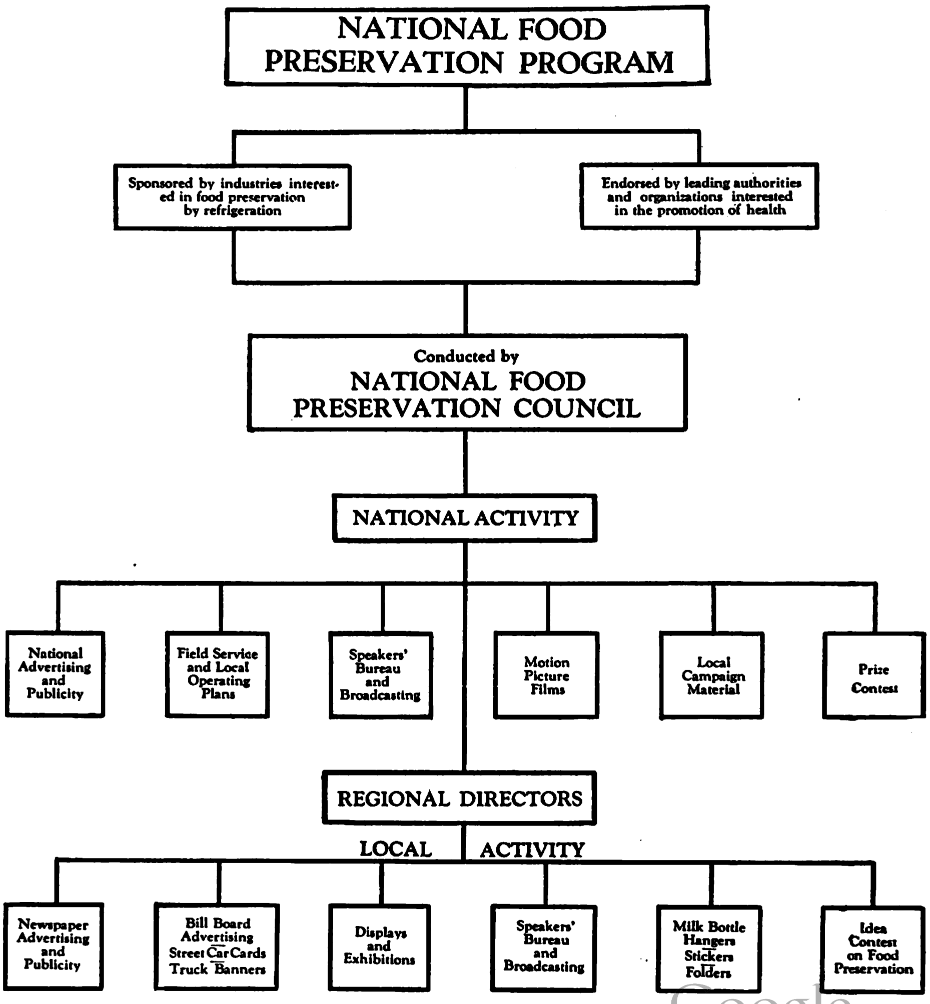
It has been accepted by many merchandisers of automatic refrigeration in northern states that concentrated selling effort has been worth while only in the summer months. The program will point out that Weather Bureau records show that 50 degrees, the danger line in food preservation, is maintained in outdoor temperature only nineteen days a year, as a national average.

Personnel of the Activity

The governing body of the program will be the National Food Preservation Council. Matthew S. Sloan, president of the New York Edison Company and president-elect of the N. E. L. A., is president of the council. J. E. Davidson, president of the Nebraska Power Company and former president of the N. E. L. A., is vice-president of the Council; P. S. Young, of the Public Service Electric & Gas Co., and treasurer of the N. E. L. A., is treasurer, and P. B. Zimmerman, sales manager, electric refrigeration department, General Electric Company, is secretary. The members of the Council are representatives of the interests and associations participating.

The program will be carried out by both national and local advertising and promotion—the national activity directly by the Council and its committees, the local activity by local councils which are being set up through a regional organization that will extend down into every community. For this purpose the entire country has been divided into twenty districts. A regional director is being selected by the Council for each district, who will be responsible for the organization of local councils throughout his district.

CHART OF ACTIVITIES


NATIONAL FOOD PRESERVATION PROGRAM
Sponsored by industries interested in food preservation by refrigeration
Endorsed by leading authorities and organizations interested in the promotion of health
Conducted by NATIONAL FOOD PRESERVATION COUNCIL
NATIONAL ACTIVITY
National Advertising and Publicity
Field Service and Local Operating Plans
Speakers' Bureau and Broadcasting
Motion Picture Films
Local Campaign Material
Prize Contest
REGIONAL DIRECTORS
LOCAL ACTIVITY
Newspaper Advertising and Publicity
Bill Board Advertising Street Car Cards Truck Banners
Displays and Exhibitions
Speakers' Bureau and Broadcasting
Milk Bottle Hangers Stickers Folders
Idea Contest on Food Preservation

The list of appointments of Regional Directors to date are as follows:

District 1
(Maine, New Hampshire, Vermont)
Roy Holden,
Cumberland County Power & Light Co.,
Portland, Me.
District 2
(Rhode Island, Massachusetts, Connecticut)
W. G. Keay,
Cambridge Electric Light Co.,
Cambridge, Mass.
District 3
(New York State)
M. E. Skinner,
New York Power & Light Co.,
Albany, N. Y.
District 4
(Metropolitan New York)
C. L. Harold,
Brooklyn Edison Company,
Brooklyn, N. Y.
District 5
(New Jersey and Delaware)
F. D. Pembleton,
Public Service Co. of New Jersey,
Newark, N. J.
District 6
(Pennsylvania)
George E. Whitwell,
Duquesne Light Company,
Pittsburgh, Pa.
District 7
(District of Columbia, Maryland, Virginia)
H. A. Brooks,
Potomac Electric Power Company,
Washington, D. C.
District 8
(Ohio. Kentucky, West Virginia)
C. L. Dunn,
Ohio Public Service Company,
Cleveland, Ohio.
District 9
(Indiana, Illinois, Michigan, Wisconsin)
E. L. Hinchcliff,
Middle West Utilities Co.,
72 West Adams Street,
Chicago, Ill.
District 10
(North Carolina, South Carolina, Georgia, Florida)
C. A. Collier,
Georgia Power Company,
Atlanta, Ga.
District 11
(Alabama and Tennessee)
A. B. Collins,
Alabama Power Co.,
Birmingham, Ala.
District 12
(Arkansas, Oklahoma, Mississippi)
R. I. Brown,
Arkansas Power & Light Company,
Little Rock, Ark.
District 13
(Louisiana and Texas)
P. E. McChesney,
Gulf States Utilities,
Beaumont, Tex.
District 14
(Iowa, Kansas, Missouri, Nebraska)
C. A. Nash,
United Light & Power Company,
Davenport, Iowa.
District 15
(Minnesota, North Dakota, South Dakota)
H. E. Young,
Northern States Power Company,
Minneapolis, Minn.
District 16
(Colorado, New Mexico, Wyoming)
G. B. Buck,
Public Service Company,
Denver, Colo.
District 17
(Utah and Idaho)
P. M. Parry,
Utah Power & Light Company,
Salt Lake City, Utah.
District 18
(Washington and Oregon)
A. C. McMicken,
Portland Railway & Light Company,
Portland, Ore.
District 19
(Northern California and Nevada)
R. T. Stephens,
Pacific Gas & Electric Company,
San Francisco, Cal.
District 20
(Southern California and Arizona)
H. G. Kenyon,
Southern California Edison Company,
Los Angeles, Cal.

The Council has engaged six traveling field specialists as organization experts. They will spend their entire time for the next three months assisting the regional directors in working out the organization and helping the local councils to prepare for full cooperation in the program.

The local councils will, in most cases, center around the electric leagues, where these exist, and will include all the electrical interests, gas companies, ice companies, milk companies, merchandisers of refrigeration and of perishable food, the medical societies, women's clubs, and other similar interests.

The Council is operating through two committees, executive and publicity. The executive committee as at present constituted consists of:

Marshall E. Sampsell, Chicago, Chairman of the Commercial Section, N. E. L. A., president, Central Illinois Public Service Company, *Chairman.*

C. E. Greenwood, New York, Commercial Director, N. E. L. A., *Vice-Chairman.*

P. S. Young, Newark, N. J., Treasurer of the N. E. L. A., treasurer of the Council, Public Service Electric & Gas Company.

J. E. Davidson, Omaha, president, Nebraska Power Company, and former president of the N. E. L. A.

E. G. Biechler, Dayton, president, Frigidaire Corporation.

George W. Mason, Detroit, president, Kelvinator Corporation.

Paul S. Clapp, New York, managing director, N. E. L. A.

C. L. Dunn, Cleveland, chairman, Refrigeration Committee, N. E. L. A., commercial manager, Ohio Public Service Company.

P. B. Zimmerman, Cleveland, general sales manager, electric refrigeration department of the General Electric Company.

E. S. Vail, Fond du Lac., Wis., president, National Refrigerator Manufacturers Association.

J. S. Tritle, Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.

The publicity committee consists of:

George F. Oxley, New York, director, Department of Public Information, N. E. L. A., *chairman.*

Earl L. Doty, Dayton, advertising manager, Frigidaire Corporation.

Walter J. Daily, Cleveland, manager sales promotion division, electric refrigeration department, General Electric Company.

Earl Lines, Detroit, advertising manager, Kelvinator Corporation.

Fred Millis, Indianapolis, president, Millis Advertising Company.

The plan for national activity includes, first, full color, single and double page advertisements in the September issues of national magazines, which in most cases will be distributed the last week in August. Articles by authorities whose names will carry weight with the American public on the benefits which the habit of proper food preservation will induce in the health of the nation have been arranged for national publications. Full editorial support of this program has been promised by a number of these publications, among them some of the principal women's magazines.

A speakers' bureau is another activity of the National Council. Arrangements have been made with health authorities, women who are widely known for their interests in developing better health habits among women and children, leading publicists, and representatives of all the interests concerned in this program to deliver addresses on the value of food preservation, and meetings will be arranged for them by the speakers' bureau.

Another division of the Council is preparing material, such as newspaper advertisements, newspaper publicity articles, window displays and truck cards for distribution to the local councils.

Lastly, a national idea contest on the subject, "Why 50 Degrees is the Danger Point," with a $10,000 model electrical home as the capital prize, and many smaller prizes, will be held.

This national program will be supplemented by similar programs of activity throughout the month in every community all over the country. Under the supervision of the regional directors, and with the active control in the hands of the local committees, there will be extensive newspaper advertising, mats or copy for which will be supplied by the publicity committee of the National Council, poster paper for billboards and cards for street-car advertising likewise will be provided. Suggested copy for newspaper articles, covering the formation and meetings of local councils, the purpose of the program, the essay contest and other activities in connection with the program will be supplied. National and local radio broadcasts, especially from stations controlled by power and light utilities, will be advocated, and suggested talks will be prepared. The entire energy of the women's committees which have done such effective work for many utilities will be directed along food preservation lines during that month. Plans for window displays have been worked out, and prizes will be offered for the best displays as shown by photographs. Local essay contests also will be promoted.

The Code Situation

Addresses made at the Chicago Conference of Company Code Representatives

THE BACKGROUND

By **Irwin W. Day**

Chairman Codes and Standards Committee, N. E. L. A.

Editor's Note: A conference of company code representatives—reported in the May N. E. L. A. Bulletin, Page 302—was held in Chicago on March 18 and 19, with the purpose of discussing the needs of the association in the code field.

The first session of the conference was devoted to addresses by prominent authorities. Mr. E. W. Lloyd, vice-president of the Commonwealth Edison Company, presided, and addresses were delivered by Judge O. B. Ryon, general counsel of the National Board of Fire Underwriters; Messrs. Sampsell and Stone, chairmen, respectively, of the Commercial and Engineering National Sections; Irvin W. Day, chairman of the Codes and Standards Committee, and Alva R. Small, vice-president of the Underwriters' Laboratories and chairman of the Electrical Committee, N. F. P. A.

The remaining sessions consisted of general discussion of the services which company code representatives are asked to render, the service which they may expect from the Association, and the best means for doing these things. The conference also discussed the various electrical codes, their characteristics and trends of development, desirable changes in their form and substance, and other matters intended to give the code representatives a general view of the situation and of their relation to it.

The addresses of Judge Ryon and Messrs. Day and Sampsell are herewith printed for the information of member companies. Other addresses made at the conference will appear in subsequent issues of the Bulletin.

In considering what features of the situation I would talk to you about at this meeting, I thought I could, perhaps, make it possible for you to better understand what this discussion of Codes and Standards is all about if I gave you something of the background leading up to the present time.

I want to go back to the time when the N. E. L. A. was not so well organized and equipped to carry on as it is today.

A good many years ago, when the idea of simplification and standardization was beginning to be accepted by industry generally, the N. E. L. A. tried to do a little something along this line for itself, and if my understanding of the matter is correct, it adopted a standard of some sort relating to some equipment. That standard seriously interfered with a certain manufacturer's product—practically ruled it out of the market. The manufacturer was prompt to bring action, and the N. E. L. A. as a result found itself in very much of a jam. The N. E. L. A. then went to the other extreme and decided to have no standards at all. Anything that was promulgated in the form of a standard was issued as a recommended practice. I believe we are supposed to be still operating under this plan at the present time.

In the course of time it became the custom to have N. E. L. A. representatives on the various standardizing and code-making bodies, and these representatives were invited in because of the interest which N. E. L. A. had in those matters. Sometimes such representative was appointed by the committee that was concerned in that particular thing; sometimes he was self-appointed, mainly because he was personally interested; sometimes he was appointed because the Association had been asked to appoint someone, and headquarters, casting around, finally found someone who could take the place. As a result, you will see, the appointments were rather haphazardly made. The lack of crystalized organization to handle these things was very much felt by the member companies. The main difficulty was that these appointees had no authority to speak for the industry as a whole. There was no routine established for obtaining a consensus from the member companies, nor for establishing Codes and Standards policies for the light and power industry. The day of joint committees to harmonize deadlocks that might occur between conflicting interests had not yet arrived, and finally the Association had entirely insufficient information to justify the stands that were taken by its representatives on these standardizing bodies.

There are many groups interested in this standardization and codification movement—the manufacturers' group, the insurance group, the telephone group, the railway group and the professional societies, such as the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, and many more.

Things got so bad finally that it was determined to establish at N. E. L. A. headquarters an engineering staff; but that did not seem to quite fill the bill; and finally a Director of Engineering was appointed. Little by little the work got organized and the N. E. L. A. began to function more efficiently in representing the views and requirements of our particular industry. Colonel William Kelly, then director of the N. E. L. A. Engineering Department, found that because of the far-reaching policies that were sometimes involved in these code matters it was necessary to have some central authority to whom he could go for guidance, and it was as a result of this that the National Executive Committee in 1926 appointed a special national committee called the "Codes and Standards Committee." It was a committee that was to be comprised of executives, not necessarily technical nor commercial, but men of broad vision and experience and able to determine policies for the Association that would not be derived from narrow technical or commercial viewpoint.

Fortunately for the Association, and for me as chairman of that committee, the members of the committee were very well chosen, and they entered upon the job of straightening out this situation with a sincere desire to cooperate and bring order out of the chaos that had existed. Mr. Marshall A. Sampsell, chairman of the Commercial National Section, who is a member of this committee, knows well the struggles we had during the first few months of the committee's existence, only two years ago.

The scope of the committee's activities was to determine policies for the Association, to prescribe principles and practices that the Association's representatives could follow, and to formulate procedure for the appointment of representatives on standardizing and code-making bodies. Soon after its organization, therefore, the committee adopted certain principles and practices and issued them in the form of a serial report in 1927. I think it would be very helpful if all of you code-making representatives were to obtain copies of this report from headquarters.

We had great difficulty in arousing the interest of the major executives. They seemed to think that this matter of Codes and Standards was highly technical, and they did not seem to recognize—at least, some of them did not—that it had a commercial side. Most of them gave it a wide berth—left it to the men down in the ranks to handle; and it was handled as a result in just the way you would expect. Things were getting rather serious; rather drastic changes were being suggested by the code-making bodies, and we finally did arouse the interest of the major executives. The appointment of company code representatives, who would handle code matters in their particular company and territory, resulted from the realization of the seriousness of the situation by these executives.

This gathering, as I understand it, is a gathering of these code representatives appointed by their respective companies.

There is quite a significant difference between Codes and Standards. Standards are more or less engineering definitions—guides as to how we can do things. Whereas Codes are in the nature of rules or laws. And because they are in the nature of laws they are apt to find themselves eventually, in one form or another, in the regulatory statutes. That is where our great interest lies. We are interested in knowing what finds its way into the statutes governing our business; and this is not a subject that can be lightly passed over.

There are many codes, but the two particular ones in which we are interested are what are known as the major electrical codes. They are very similar in name and are confused because of this similiarity.

The *National Electrical Code* is what is known as the "Fire Code," and is sponsored by the underwriters or insurance interests.

The *National Electrical Safety Code* is the "Casualty Code" and is sponsored by the United States Bureau of Standards.

Those are the two codes in which we have the greatest interest.

The National Electrical Code is the one that we are particularly interested in at this time, because of its requirements relating to wiring. The code has both a commercial as well as a technical side, and the chairmen of the Commercial and Engineering National Sections of the Association are here to tell you a little of those two sides of the question.

I hope you will be impressed with the importance of this code question when you leave here, and that you will pass on your impressions to your fellowmen, and particularly to your executives, because we must keep their interest aroused. The only trouble we are having right now is that we have aroused it so thoroughly they want to cure things in a minute, and they can't be cured so quickly. The codes have been years in building; I do not know that they will be years in reconstructing, but certainly it cannot be done in a minute. Nevertheless, the result of arousing the interest of the major executives has been the key to curing the situation, so far as the electric light and power industry is concerned. A series of conferences has been held with the manufacturers and with the insurance interests, all looking toward a real understanding of our mutual problems, and a common meeting ground has been established for the proper formulation of these code provisions which so seriously affect all of us.

I am glad to say that these meetings have been productive of most helpful and harmonious relationships. We understand each other a lot better than we did before. We don't look upon the other fellow quite so suspiciously. In fact, we feel that all fifty-two cards are now on the table, where we can see them and we feel sure that each card will take its proper place in the trick.

The situation is being clarified, and fortunately so, for the first time in a great many years the N. E. L. A. is on the road toward a safer and saner and more acceptable series of codes with which it has to deal in the conduct of its business.

THE FIRE UNDERWRITERS' PROBLEM

By O. B. RYON

Consulting Counsel, National Board of Fire Underwriters

THERE are some things we all know about electrical appliances and their use—some common interest shared by the utilities whose interests you promote, the fire insurance companies I represent and the public we both try to serve—while I cannot, for lack of technical training, put these matters of common interest into your terminology I may at least suggest some of them in the vernacular.

Possibly some of these frequent and familiar instances, involving electrical energy, may be related to the "National Electrical Code" and if so both you, the fire insurance companies and the public are concerned.

It is a pleasant, appetizing and cheerful experience to come into the dining room for breakfast and see a shining electric toaster or waffle iron ready and willing to function, but the joy of such an experience is worse than destroyed if, when the appliance gets into action, it is found defective either as to construction or installation and sets the house on fire.

It is mighty nice and convenient to push a button and strike a light or turn on the radio, but if crossed wires or some other defect smokes out the whole family it's not so good.

Your industry has put into our houses, electric washing machines, carpet sweepers, flat irons, water softeners, refrigerators and fifty other devices making household drudgery almost a thing of memory and we want more of them, and are willing to pay you for them and their use as fast as you can invent them, but we don't want to multiply the dangers to life and property by the same process—and neither do you.

The Stock fire insurance companies want to write all the fire insurance possible, including more of the utility companies than at present, but only under such conditions of safety as are required by sound underwriting.

We want you to supply electricity for all the bread toasters the people will buy, but we also want you to insist that these appliances shall conform to some established and recognized standard of safety, always having in mind that we insure the places containing this multitude of things electrically operated, and your carelessness or indifference may be our disaster.

I fancy this homely household illustration will give us at least a hint, of what was in the minds of the little group of fire insurance men who, nearly forty years ago, met in New York for the purpose of preparing, as best they could from the experience and data then available, a code regulating electrical installation.

There was not much to know—not much experience—because the business of generating and distributing electric energy was very much in its infancy, but from that beginning has come the long years of study, research and cooperative effort which makes the present "National Electrical Code" the recognized and final authority. I suppose it is a long way from perfect, otherwise you men would not occupy your time with such meetings as this, and I am very certain the sort of cooperation born of common interest is the incentive for bringing the fire insurance companies and Underwriters' Laboratories into your counsels.

The fire insurance industry has a great number of men, with all sorts of equipment and training along the lines of your work, who are always ready and willing to be of service and to cooperate with you when they can.

YOUR problems are ours in more than the ordinary sense because your mistakes are reflected in our loss ratios.

Fire insurance is immediately and vitally interested in what you do and how you do it purely as an underwriting matter, but we are also very much interested in some other problems which concern you and ourselves which have nothing immediately to do with producing or distributing electrical energy or selling fire insurance.

We have in the National Board of Fire Underwriters an activity known as the Committee upon Public Relations, the function of which is to try and carry to the insuring public the facts about our business, how it is done, how rates are made, why our requirements are necessary and reasonable, that we are not gamblers or highway robbers but conservative business people with a tremendous responsibility and a very large investment.

That the indemnity we furnish is the foundation of the industrial and commercial structure of the nation—that business cannot exist without us.

We have for many years been talking these things among ourselves and making a few speeches about them but now, through newspapers and other recognized advertising media and by regular advertising methods, we are getting to the public facts and data about our business, in the hope and belief that when they know us better they will like us better.

We are trying to take the facts about fire insurance out of the realm of speculation and platitude and put them into the province of reality and understanding.

There is a peculiarity about fire insurance not found in any other industry or commercial activity, with the possible exception of some other branches of insurance.

We sell indemnity—something not the subject of touch, smell or any other sense—something intangible—something which the commercial world must have in order to exist, but which differs so essentially from any other commercial relation that it requires more selling and explanation than most business transactions.

FIRE insurance is a negative proposition. When a man buys shoes or food or clothing, a home, a farm or a factory or even electric energy, he gets something concrete and tangible for his money.

When he buys fire insurance he pays for something which, if he is honest, he hopes will never happen, indeed if he has studied the "possibilities" he knows the chances are several hundred to one nothing will happen and so when his policy expires and has become waste paper there is, somewhere deep down in his inner consciousness, a misgiving about the necessity for the whole transaction and he must be more than ordinarily sound philosophically if he does not wonder whether after all he has not paid something for nothing.

This psychological condition—this attitude of mind—which is more general and persistent than might be thought possible, is one "Public Relation" we want to reach and correct because it is harmful and touches our business so immediately.

We have, however, broader, more comprehensive and much sounder reasons for the advertising campaign which is in progress and which I believe will continue, and the chief of these reasons is our desire to make such contribution as we can, to the thesis that all business and industry no matter of what nature or by whom conducted, if legitimate and necessary is, by the nature of our commercial structure, so related to every other business, commercial and industrial agency and our interests are so intermingled and inter-related, that one cannot prosper without the others.

The success of the Public Utilities depends upon the success of every other business including insurance and to some of us this is so obvious it hardly needs emphasizing—we know it so well that it seems idle to talk about it—old stuff of the stalest variety and yet it is a fact that, notwithstanding all the gospel of cooperation and inter-relation which has been preached, there is still a vast uncultivated field for this sort of endeavor.

The "Public" has heard but not heeded.

A few days ago I heard a speech upon the inter-relation and inter-dependence of business in which the speaker used this illustration—maybe the story is apochryphal—but no matter—it's a good story anyhow.

IT seems that after the World War when all Europe was devastated and production at a standstill the markets of South America were industriously cultivated by American manufacturers.

South America was prosperous and musical and among other industries in the United States which profited by this condition was the piano business and large orders for pianos were placed for consignment to the various South American Republics.

Then came the rehabilitation of Europe, the financial depression of 1922 and 1923 and word came that South America couldn't pay for any more pianos and the result was a small stampede of American piano makers.

The steel wire makers, veneer men, felt manufacturers passed out the word to suspend operation and there was prospect of serious trouble in the piano industry.

Just when this situation became most serious a genius out in Omaha invented and began marketing a confection known as "Eskimo Pie," made of ice cream and covered with chocolate.

The new sweet had immediate and wonderful popularity, demand was unprecedented in the history of this sort of thing and the first result was the solution of the piano makers' troubles over the South American market.

Chocolate, which covered these millions of bonbons, is a South American product.

The chocolate market boomed, South America was prosperous—the "Eskimo Pie" saved the American piano industry.

Well maybe it didn't but no matter.

The real thing is happening every year—perhaps every day—we must hang together or hang separately—none of us can succeed alone.

We all know this—preaching such a gospel seems almost childish—but look out over the business world and see how far we still are from practical realization of this great principle of cooperative effort and inter-relation.

Fire insurance wants your business to be a success but, while you are going upon your way, we want you to remember our needs and the contribution we make to your progress and achievement.

Now the fact that you are in daily contact with fire insurance engineers and that you so recognize the inter-relation of your business and ours is the best evidence that, upon this phase of public relations, your views and those of the stock fire insurance companies are in very practical harmony.

The first three of these public relations is cooperation—inter-relation—inter-dependence.

It is not possible, in half an hour, to go into very much detail exploiting this or other relations or interests common to industry and commerce.

THERE is one very "Public Relation" upon which I feel very strongly and which is of first importance not only to utility corporations and insurance companies, but to every business or industry.

Again, I may be open to the charge of threshing over a lot of old straw, but until the people of this country have been thoroughly educated and finally convinced, I shall not cease agitation wherever and whenever there is opportunity, against the evils of public ownership or operation of public utilities nor the encroachments of socialistic experiments in any field of endeavor.

There is a very strong feeling, as all of you know, that the public utilities of this country instead of being initiated and conducted by individual enterprise and for private profit, should be taken over by the Government, by States or by municipalities and operated as the term is used by this class of economists "for the public good."

We believe that a nation can only be great, prosperous and enduring as the individual citizens are independent and aspiring and that the kind of independence which produces this result must have as its incentive individual reward for its enterprise.

So I do not believe that the Government, the States or municipalities should encroach upon the domain of private enterprise nor do anything which individuals can and will do, I believe better and, in the long run, cheaper than by Government agency, but even if this were not true I should still believe in individual ownership and operation under proper supervision and regulation. The State should never do for the individual citizen what he can do for himself.

Senator Pat Harrison in a recent speech reduced the whole gospel to a short and convincing statement when he said at Boston "The theory of our government is repugnant to the government going into business in any case where the individual himself can do it."

It is only in those cases of the public weal where private initiative will not and cannot do it, that the Government is then justified in stepping in.

No more do I believe in socializing insurance and there is no more reason for a body of business men or manufacturers to meet and agree to insure each other and take the profit out of the business for everybody but themselves, and thus socialize it, than there is for a municipality to take over an electric light and power plant and run it as a community enterprise.

The principle involved is the same in both instances.

So while you gentlemen are very intimately and immediately concerned in this question of public ownership and operation, do not forget that we want you to exist and want to help you continue in your prosperity and that every influence we have will be exerted in this direction but we believe that, when we have fulfilled what we conceive to be our obligation to a common cause, that we may reasonably expect that obligation will mean reciprocity.

As you pass along and meet these problems and are looking about for help in their solution do not forget that the stock fire insurance companies have, and will continue to have, approximately nine-tenths of the business of this country with more than that percentage of capital investment and responsibility.

A FEW years ago a proposition was made in quite an important western city to take over the gas, light and power properties and operate them as municipal enterprise.

Naturally, the local utility company was very much disturbed by this situation and called for assistance. Among other bodies the Local Board of Fire Underwriters was urged to oppose the scheme and as a matter of fact unreservedly did so.

It was discovered, however, that the utility's property of several million dollars was all insured in a group of eastern mutual companies, and the insurance agents of the city, who were breaking their necks to help the utility people, as well as their companies which encouraged them to the effort, were penalized by the socialistic action of the utility company.

There was a sort of a grim humor in this situation which I believe will appeal to the most of you.

A good many years ago Herbert Quick wrote a book called "On Board the Good Ship Earth."

It is a volume full of rather quaint and sometimes sound philosophy and I think you will all find it interesting reading although, like myself, you very likely will not agree with many of the conclusions or implications.

The writer compares the earth to a great ship sailing upon a practically uncharted ocean with no final destination or day of arrival.

All the people are passengers and they can't get off the boat.

On board ship there is so much food, and fuel and clothing and other necessities and the question he discusses is how shall these necessities of life be apportioned and used that the voyage may be safe, pleasant and profitable.

How shall all this great passenger list conduct itself so they may get the most out of the voyage with the least discomfort and inconvenience.

THE earth, as a great ship sailing through space, has just so much iron and coal and sulphur, phosphorus, lumber and other things which go to make civilization possible and life comfortable, none of which can be replaced when exhausted, and the purpose of the book is to discuss just how these things shall be handled, what is to be done with them and who shall own or control them and kindred subjects.

Really, the subject of the book is the "Art of living together in the world," and when that theme gets a thorough hold upon your minds you will realize how such a book may contain a lot of things intimately related to such a conference as this, because after all the big thing in the world is now, has always been and always will be the "Art of living together."

When we solve that problem nothing will remain to be done and until we solve it there will be plenty of room for more sorts of cooperative thinking and doing than so far the world has developed.

The "Good Ship Earth" has sailed a long way upon her course and, while some of the passengers have made a lot of trouble and taken more than a fair share of the common store, the voyage has not been seriously uncomfortable or unsuccessful.

The world is getting better—the relations are more cordial, helpful and considerate.

In business the old *Laissez Faire* theory, which is the "devil take the hindermost," has given way to cooperation, collaboration and mutual understanding.

Competition is no longer said to be the "life of trade" but is known to be its destruction.

The world is slowly but surely solving the problem of "living together."

In the Book of Genesis, after the world's first great tragedy, the defendant tried to dodge the issue and, declining to plead to the indictment, asked the question, "Am I my brother's keeper?" and the world ever since has been asking and apparently unable to answer that question, but is still trying and making progress.

You gentlemen are here for a couple of days asking and making your contribution to the answer of the same question.

The "National Electrical Code" and its requirements may be only a drop in the great ocean of cooperative effort which will finally make the "Good Ship Earth" an ideal place to live, but it is a "drop," and if your task is well done, if you enter upon and finish your work in the spirit of mutual help and consideration, if you think of somebody else while taking care of yourselves, you will have made your little contribution to the answer of the world-old question in Genesis.

This is "Public Relation"—the interrelation and interdependence of all business and all individuals.

My friends, the world will continue the same interrogatory and hope for the same thoughtful attempt at an answer until Gabriel shall sound his horn and the millennium shall come and then, in the language of the vaudeville, we can "wash up and go home," because we will no longer be interested in the "National Electrical Code" or kindred subjects and those of us who are not playing a harp will be concerned, if the theologians are correct, with a branch of the fire insurance business where everything is a total loss.

THE COMMERCIAL DEPARTMENT'S INTEREST

By **Marshall E. Sampsell**

Chairman, Commercial National Section, N. E. L. A.

THIS Conference of Company Code Representatives has been called to furnish a general background for the important duties that you are undertaking. Mr. Day has told you how codes and standards and ordinances react in a definite way upon our industry, and I have been asked to address you on these reactions as they concern the Commercial Departments of power supply companies.

When I was made chairman of the Commercial National Section they requested me to adopt a slogan for the section, and having in mind the necessity for cooperative work, both within the N. E. L. A. and the other important branches of the entire electrical industry, I suggested we change the then slogan, "More Kilowatt Hours Per Capita,'" to "More Kilowatt Hours Through Group Teamwork." I am sure this thought was prompted in part from my experience as a member of Mr. Day's committee.

The Commercial Section has devoted itself this year principally to the handicaps to commercial progress, such as the continued increase in price of wiring, due in no small measure to code restrictions. Our Wiring Sales Committee, in conjunction with the Engineering Section, has been engaged in the study of the code.

Mr. Lloyd mentioned the necessity for proper rates. Too much stress cannot be put on this most important subject. It is not contended the rates of our operating companies are too high but that in many cases they are not set up in a form to encourage a freer use of our electrical energy. The Promotional Rates Committee of the Commercial Section, of which committee Mr. Lloyd is chairman, has been closely studying rate forms for domestic service and promotion of the adoption of inducement rates by the power companies.

With adequate and not too expensive wiring and proper rates must go hand in hand well trained salesmen, and so our Commercial Section has fully appreciated the need of "specialists" and, as a feature of our work this year, schools have been successfully organized for house lighting, industrial heating, commercial cooking and electrical advertising.

We have also been giving careful study to the prices of apparatus and to the quality standards in types of appliances we sell. You can, of course, see how intimately related this subject is to that of adequate wiring in the house, without which there is little sense in trying to load the home with modern appliances and labor saving equipment. To bring this about we cannot be content with merely technical engineering results, but must have continued and helpful cooperation from our commercially trained minds and close cooperation by all groups, other than our own, in order that we may bring into the picture some of the scenery that was so ably discussed by the counsel for the insurance companies.

I have had some suspicions, not only of the insurance people themselves, but of some of the other groups of our great industry, but those suspicions were the result of insufficient information on my part as to the real reasons why some of the opposition we construed to be just stubborn opposition on their part has been brought into this picture, and I am now firmly convinced, as we get to know each other better and put the cards on the table, discussing what each card stands for, this problem will be worked out—not in a month, perhaps not in a year—but it will be progressively worked out so that in the end the business we are entitled to secure can be added to our lines to the satisfaction of the customers we take on, and to the benefit of all branches of our electrical industry and to the other groups interested in our success.

In my judgment there is no more important work in this whole N. E. L. A. set-up than the work you are now engaged in; it is the neck of the bottle. But not only that; there is a strong cork in the top of the bottle. We want to uncork that bottle, and you are the gentlemen who can best help do it with us.

Public Relations Report

(*Continued from page* 342)

men since the dawn of society and departed from the straight and narrow way, and is not the startling record of our accomplishments in the past forty years worth something in the balance?"

The accomplishments of the past are but an index to what the accomplishments of the future may be. Our industry will continue to be a constructive force in the life of the nation only as we deserve it. It will be stable only as we are right. Being right, as I believe the industry is, as nearly as it is possible for any human agency to be right, let us not hesitate to continue to give to those for whom we are trustees of a very important service an account of our stewardship. Let us continue to fight for what we believe to be in the best interest of the American people. Let us not stoop to pettiness. Let us not sully our great industry by deeds that will not bear the searching light of day. The record of our accomplishments reveals the contribution to society and the race too valuable to need anything but straight-forwardness to insure lasting prosperity of the electrical industry.

Service Suggestions

NATIONAL ELECTRIC LIGHT ASSOCIATION — COMMERCIAL NATIONAL SECTION
CUSTOMER RELATIONS COMMITTEE
H. T. EAST, *Chairman,* Public Service Co. of Northern Illinois, Chicago, Ill.

To formulate efficient methods of conducting relations between the customer, the public and the supply company, including such matters as taking applications in the office, forms, order routing, inquiries, complaints, meter reading, collections and credits

No. 72 June, 1929

Teaching Customers to Read Their Meters

By J. C. BARNES

Director of Advertising, New Orleans Public Service, Inc.

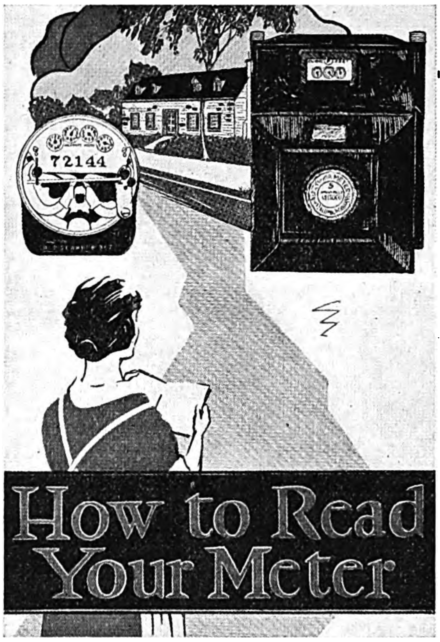
THE New Orleans Public Service, Inc., has inaugurated an extensive campaign to teach customers to read meters. There is just one purpose behind the campaign, according to officials of the company—to promote better public relations.

There are many reasons for the lack of proper understanding between utility companies and the public they serve. The fact that these companies are large corporations which enjoy monopolies operates to their disadvantage in winning good will. But perhaps the greatest obstacle to be met in a program of promoting better public relations comes from the fact that the commodity furnished is intangible and the customer has no way of checking the amount of electricity used to determine that he is not being charged for something that he did not receive.

Majority of People Honest

Our meter reading service is based on the belief that the majority of the public are honest; that the average citizen is not looking for something for nothing but is willing to pay fairly and honestly for that he knows he had received. It is the inability of the customer to check his service bill that causes the difficulty.

Mr. John Brown, for instance, receives his bank statement. He finds that his net balance is much smaller than he thought. He immediately jumps at the conclusion that the bank has made an error in tabulating his checks, or that they have charged the checks of some other Mr. Brown against his account. He forthwith totals his checks, and if his case is the usual one, he finds that he has issued a few checks which he has forgotten, or which he failed to deduct from his balance. He finds that the bank is correct and there is no alternative but to be satisfied.


72144
How to Read Your Meter

Reduced cover of Instruction Booklet for customers of New Orleans Public Service. The section giving instructions on how to read the meter is reproduced hereunder and on the next page.

It is very easy to read a meter. You can learn to read it just as easily as you learned to tell time. At first it takes a little while and appears difficult, but after a little practice the dial can be read at a glance, just as you can tell the time by a glance at the watch or clock.

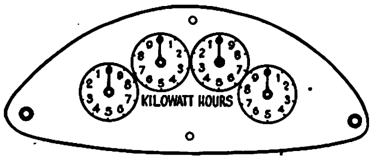


Figure 1

Mrs. Brown Can Check Her Grocery Bill

Mrs. John Brown receives her grocery bill or drug store bill at the end of the month. The total may be surprising. It may be so large as to instantly arouse a suspicion that there is an error, due to the negligence of the store in accounting, or a willful desire to defraud. This suspicion can either be dispelled or definitely confirmed by checking the items on the bill. Not so with the gas or electric bill. If there has been an unusual number of dark days requiring an extraordinary amount of artificial light, the customer has no list of these unusual days by which he may determine whether he has actually used the service or not. He usually jumps at the conclusion that the meter reader has made an error in reading his meter, and not having any way of checking it himself, the suspicion lingers in his mind and ill-will against the utility company is created.

But it is obvious that if the customer can read his own meter accurately he has the same facility for checking his gas and electric bill that he has for checking his bank statement or his grocery bill. That being so, one of the greatest causes of friction between utilities and customers is removed where customers are equipped to check their meter readings.

Not a Mere Gesture

With this basic psychological fact in mind, this company began a study to determine the best manner in which to conduct a meter reading campaign that would overcome the condition. Of course, it could have been offered in such a way as to be a mere gesture. Small pamphlets could have been printed and the public asked to write in for them, but it was not the thought of the department to make a mere gesture.

The company was convinced of the value of the customer meter reading service and was sincere in wanting to offer a real effective service. It was decided to install a meter reading school on the first floor of the company's down town office building. Standard meters and special instruments designed to simplify the teaching of meter reading were installed. A meter reader who had had years of experience and who was known to be of a friendly and affable nature and who possessed the ability to instruct was selected to conduct the school.

Wide Publicity Given Plan

Car cards were placed in all of the street cars of the city calling attention to the new service. Inasmuch as approximately 80 per cent of the New Orleans public rides the street cars, this alone proved a very valuable medium. Stickers were also attached to the gas and electric bills calling attention to the new service. Articles were carried in the street car "Service" bulletin, a leaflet placed in the cars each week with an estimated circulation of 100,000.

By the use of these mediums a very comprehensive publicity program was used to acquaint the public with the new service.

Newspaper advertising was freely used to announce the plan and to aid in putting the idea across. A series of display advertisements was released to the four daily papers of the city. A large advertisement captioned "YOURS IS READY NOW" announced the opening of the reading school. The copy was featured by a cut of a booklet, "How to Read Your Meter."

Instruction Booklet

The booklet referred to was made up in an artistic manner with a three-color cover. It contains 18 pages and offers a simple, comprehensive course in reading meters. It is well illustrated and simple problems are given by which almost anyone who can read can learn how to read meters. An added feature of the book, which it was expected would cause it to be kept in the home as a reference, was the inclusion of a table showing the net bill corresponding to every monthly consumption from 0 to 200 kw-hr. under the company's rate schedule. It was the belief of the company that this table would prove a great convenience to the customers in calculating the amount of their bills after they had read their meters. Several thousand of these booklets were ordered with the request that the forms be held in case extra numbers were required. The subsequent demand made it necessary to place large additional orders.

Readings should be taken from right to left.

The right hand pointer governs the one on its left in each instance.

A complete revolution of the pointer in the first circle on the right hand indicates 10 kw.-hr. The next to the left indicates, in one revolution, 100 kw.-hr. The next similarly indicates 1,000 kw.-hr., while the pointer in the circle on the extreme left, in one complete revolution, indicates 10,000 kw.-hr.

When a hand or a pointer on any of the circles is between the figures 2 to 3, 3 to 4, etc., the smaller number is always read.

The hand or pointer on the circle to the right must make a complete revolution, that is, reach zero, before the pointer in the next circle to the left has moved one space or division, that is, from 1 to 2, 3 to 4, etc.

To obtain the consumption, substract the previous reading, shown on your last bill, from the present reading. The difference is the number of kw.-hr. used.

For convenience, "kilowatt hours" is usually abbreviated to "K W H."

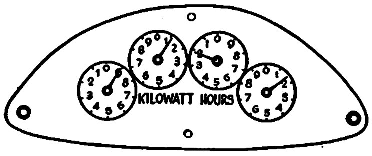


Figure 2

Fig. 2 is an example of an ordinary dial reading.

Commencing at the first circle on the right, the last figure passed over by the pointer, reading clockwise, is 1.

The next circle to the left shows the figure passed to be 2, bearing in mind that the direction of the rotation of this pointer is counter clockwise.

The last figure passed by the pointer on the third circle to the left is 1, while that passed by the last pointer to the left is 9.

The reading to be set down, therefore, reading from left to right is 9121.

If, for example, the reading shown on the bill for the month previous was 9105, it is to be substracted from 9121, the present reading.

Thus, from	9121
Substract	9105
The difference is...........	16

This difference of 16 is the number of kw.-hr. (K W H) used in the period between readings.

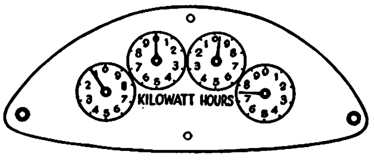


Figure 3

In a similar manner the dial shown in Fig. 3 may be read. In this case, however, three of the pointers rest nearly over the numerals, and care must be used to follow the directions to avoid error.

Commencing at the right, the first pointer reading clockwise indicates 7; the second pointer, reading counter clockwise, has passed 9 and is approaching 0.

The third pointer appears to rest directly over 0, but since the second pointer reads 9, the third cannot have completed its revolution, and hence the figure last passed is set down, which in this case is 9.

Similarly, the fourth or left hand pointer appears to rest directly over 1, but referring to the pointer next to it on the right, we find that its indicator is 9, as just explained. Therefore, the fourth pointer cannot have reached 1, so we set down the last figure passed, which is 0.

The figures as they have been set down, therefore, reading from left to right are 0997, which is the correct reading.

If, for example, the reading shown on the bill for the month previous was 980, it is to be substracted from 997, the present reading.

Thus, from	997
Subtract	980
The difference is...........	17

This difference of 17 is the number of kw.-hr. (K W H) used in the period between readings.

Another newspaper advertisement captioned "HE WILL SHOW YOU" was released for the second week. This featured a picture of the meter reader selected to teach customers how to read their own meters. This ad also announced the hours of the school to be conducted in the company's down town office and offered to furnish copies of the booklet free. The public was advised that a booklet would be sent in response to telephone or mail requests if it was not convenient to call at the company office.

For the third week of the new service an advertisement captioned "IT'S EASY TO READ YOUR METER" was released. The copy featured an electric meter and a photograph of the meter reading school layout. A blank form for convenience in ordering the booklets was also included. A fourth newspaper advertisement was headed by the query, "CAN YOU READ YOUR METER?" This series proved very effective in acquainting the company's customers of the new service.

Popularity of Service Continued

At the time this article is written the service has been in effect for over two months and the meter reader instructor is kept almost as busy now as he was the first week that the service was offered.

The enthusiastic response of the public to the meter reading service exceeded all expectations, demonstrating conclusively that the company had correctly analyzed one of the causes which results in ill feeling on the part of the customer. Thousands of our customers were anxious to know how to read their meters and quickly availed themselves of the opportunity to acquire this knowledge.

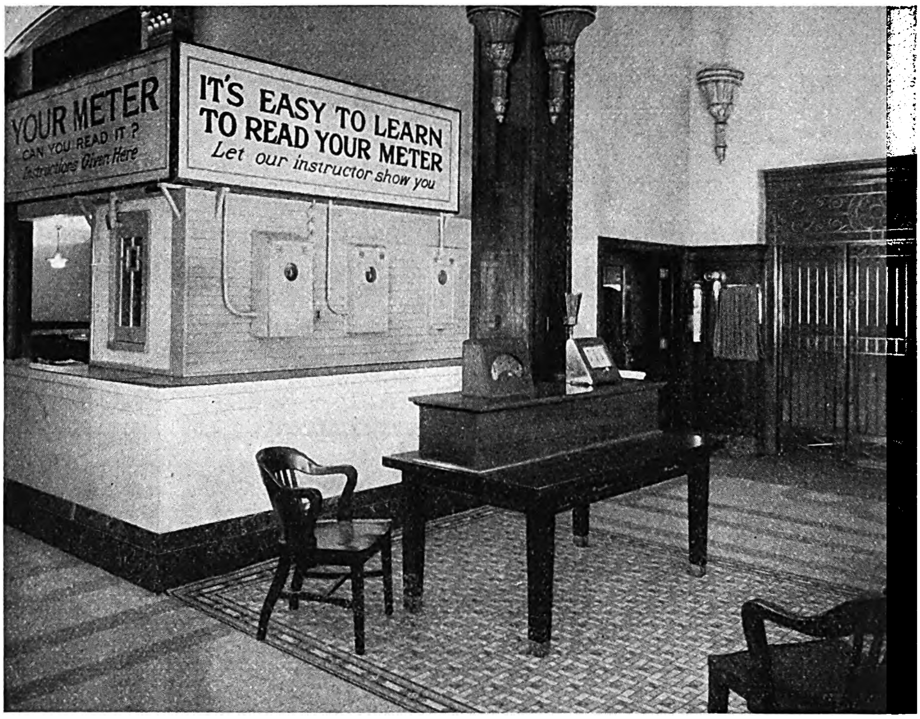
It cannot be doubted that many of these customers had at one time or another harbored the feeling that they had been overbilled for electric service they had used through wrong meter reading.

Whether the customers will check the reading of their meters from month to month is to be seen, but what our customers in this city know is this, that the company has made a sincere effort to acquaint each and every one of its customers in the simplest, most convenient and effective manner possible, with the knowledge of how to read their own meters. Even if customers do not check readings or bill computations their possession of this knowledge will do much to improve their attitude toward the company and build confidence in the meter.

Public Realizes the Effort Is Sincere

The public of this city knows that the company was, and is, sincere in wanting all of its customers to know how to read their meters. That in itself has done much to overcome that basic suspicion that everyone has when he pays a bill, the amount of which he has no means of checking to determine its accuracy.

It is the belief of the officials of the New Orleans Public Service, Inc., that, from a standpoint of promoting good public relationship, the customer meter reading service has proved one of the most effective things done with that purpose in view. It is their belief that the service will have a far reaching and continued effect. In all probabilities the customer meter reading service may be resumed again at some later period in order to afford new customers the same opportunity of acquiring this information that has been offered to those who are now customers of the company.


YOUR METER
CAN YOU READ IT?
Instructions Given Here
IT'S EASY TO LEARN TO READ YOUR METER
Let our instructor show you

Office Display of New Orleans Public Service Company

The Customer Relations Committee issues a service suggestion monthly. Each contains some workable plan for service improvement or idea which will aid in promotion of customer good will.

Subjects of recent issues were:

63—Courtesy Letters.
64—Tree Trimming from Public Viewpoint.
65—The Telephone as a Service Medium.
66—Handling Requests for Discount Allowances.
67—Informing our Customers About our Business.
68—Training Employes in Customer Relations.
69—Records That Speed Service.
70—Employe and Consumer.
71—Correspondence for Good Will.

Reprints of the present issue or any of those listed above can be furnished in any quantity at 5c each. Order direct from the chairman.

H. T. EAST,
1427 Edison Bldg.
Chicago, Ill.

INTERPRETATIONS of ELECTRICAL DEVELOPMENT

By Statistical Research Department, N.E.L.A.

Basic statistical information on the electric light and power industry issued monthly by the Statistical Research Department of the National Electric Light Association,* 420 *Lexington Ave., New York, N. Y.

H. A. Snow, ***Chairman, Statistics Committee, Accounting National Section***
Wm. M. Carpenter, ***Research Statistician***
H. S. Bennion, ***Director of Engineering, N. E. L. A.***
Merle Rainey, ***Assistant Statistician***

Current Statistics of the Electric Light and Power Industry

The data here presented are for the total (100 per cent) electric light and power industry and are based on monthly reports received from some 400 companies, representing over 80 per cent of the industry. See next page for comment.

	FEBRUARY		Per Cent Increase	MARCH		Per Cent Increase
DURING MONTHS OF FEBRUARY AND MARCH	1929	1928		1929	1928	
*Kw-hr. generated (net)	6,960,730,000	6,334,094,000	+ 9.9	7,486,236,000	6,695,351,000	+11.8
Add—energy imported from Canada and purchased from outside the Electric Light & Power Industry	164,026,000	224,267,000	−26.9	202,208,000	225,732,000	−10.4
Less—energy used in electric and other departments	219,000,000	222,000,000	− 1.4	219,000,000	236,000,000	− 7.2
Total energy for distribution (kw-hr.)	6,905,756,000	6,336,361,000	+ 9.0	7,469,444,000	6,685,083,000	+11.7
Sales of energy in kw-hr. for:						
Farm service (not involving irrigation)**	6,183,000	....	....	6,072,000	2,651,000	....
Farm service (involving irrigation)**	21,011,000	....	....	47,659,000	41,469,000	....
Domestic service	920,471,000	795,376,000	+15.7	834,822,000	729,243,000	+14.5
Commercial service:						
Small light and power	1,110,906,000	999,227,000	+11.2	1,072,469,000	947,226,000	+13.2
Large light and power	3,401,355,000	3,004,441,000	+13.2	3,501,600,000	3,156,292,000	+10.9
Railways and railroads (motive power)	478,920,000	479,440,000	....	466,870,000	488,941,000	− 4.5
Other sales to ultimate consumers	189,104,000	172,877,000	+ 9.4	191,683,000	162,381,000	+18.0
Total sales to ultimate consumers (kw-hr.)	6,100,756,000	5,451,361,000	+11.9	6,067,444,000	5,484,083,000	+10.6
Total revenue	$176,219,000	$163,440,000	+ 7.8	$169,785,000	$157,752,000	+ 7.6
Revenues from sales for resales and miscellaneous (included above)	$9,500,000	$8,930,000	+ 6.4	9,635,000	8,021,000	+20.1
DURING THE TWELVE MONTHS ENDING	FEBRUARY 28			MARCH 31		
*Kw-hr. generated (net)	83,492,000,000	....	....	84,282,892,000	....	....
Add—imports from Canada and purchases from outside the Electric Light & Power Industry	2,261,000,000	....	....	2,237,940,000	....	....
Less—energy used in electric and other departments	2,629,000,000	(Comparable data will be available with the December 1929 report and at the end of each month thereafter)	....	2,612,000,000	(Comparable data will be available with the December 1929 report and at the end of each month thereafter)	....
Total energy for distribution	83,124,000,000		....	83,908,832,000		....
New generating capacity installed (kw.)	1,890,000		....	1,900,000		....
Number of new customers added						
Farm customers	1,213,000		....	1,147,400		....
Domestic customers			....			....
Commercial customers	252,000		....	261,700		....
Others	1,000	....	....	....	....	....
Total customers added	1,466,000	....	....	1,409,100	....	....
Important factors:						
Percentage of energy generated by waterpower	38.7	....	....	38.8	....	....
*Average pounds of coal per kw-hr. generated	1.71	....	....	1.70	....	....
Domestic service (residential use)						
Average annual consumption per customer (kw-hr.)	463	....	....	468	....	....
Average revenue per kw-hr	6.54	....	....	6.50	....	....

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*By courtesy of the U. S. Geological Survey with deductions for plants not considered electric light and power enterprises.
**As reported by 183 companies only.

Electric Light and Power Statistics for Month of March

INTERESTING trends are outlined by a comparison of the performance of the electric light and power industry during the first quarter of 1929, as compared with figures for previous years. Electricity sold to consumers increased by 11.8 per cent over the same quarter of 1928, reflecting in large measure the much higher level of industrial activity this year. Domestic service, especially, has been stimulated not only by the growth in the number of consumers but also by a substantial increase in the amount used *per consumer* and shows a growth of 14 per cent, as compared with 14.9 per cent for the entire year 1928.

Revenues received from the public have, however, not kept pace with kilowatt-hours sold. During the past first quarter, they were 7.5 per cent above the corresponding period of last year, as against a gain of 8.2 per cent during the entire year of 1928 and of 13.3 per cent during 1927. This reflects, in no small degree, the results of the industry's general policy of passing on to the public the benefits resulting from the economies of improved engineering and management.

The number of new domestic consumers is slowly declining. During the twelve months ending March 31, there were 1,147,400 homes added to the lines of the country's electric light and power enterprises. This compares with 1,213,000 during the twelve months ending February 28, and 1,204,000 for the similar period ending January 31. This, however, is in line with expectations, inasmuch as the aggregate of unwired houses is steadily diminishing in urban communities and the number of new customers depends more and more upon new building construction. This, in turn, is showing increasing signs that the deficiency in housing which originated during the war period is rapidly being overcome.

Statistical Data for the Electric Light and Power Industry —1928

Statistical Bulletin No. 3, the third of a series to be issued at intervals for the information of all interested in the electric light and power industry and covering operations for the year 1928, has been completed and is ready for distribution. It is strictly comparable with similar Bulletins covering the years 1926 and 1927, and accounts for the entire operations of the industry, including the light and power business done by electric railways. Copies are available at N.E.L.A. Headquarters without charge and the report will also later be reprinted in this BULLETIN. It is also expected that a further elaboration of these figures, together with important items which have appeared during the past year in "Electrical News Items" will be incorporated in a new revision of the statistical section of the Association's handbook: "The Electric Light and Power Industry in the United States."

Basic Information on the Electric Light and Power Industry

As of March 31, 1929

The data included in this table are basic factors of the electric light and power industry and will be brought up-to-date at the end of each month and published in each issue of the BULLETIN.

1.	Value of plant and equipment (estimated)	$10,150,000,000
2.	Total generating capacity in kw	27,790,000
	Steam	19,910,000
	Waterpower	7,584,000
	Internal combustion	296,000
3.	Total number of customers served	23,627,000
	Farm customers (included below)	208,000*
	Domestic customers	19,267,000
	Commercial customers	4,260,000
4.	Population in electrically lighted homes (Electrical World)	81,500,000
5.	Percentage of homes which are served with electricity	66
6.	Miles of transmission lines (11,000 volts and above) (1927) (circuit miles)	150,000

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*As reported by some 186 companies only.

N. E. L. A. Index of Industry and Trade

ALTHOUGH February and March failed to surpass the extraordinary high level attained in January, the first three months of 1929 mark the busiest first quarter of any year since the remarkable winter of 1919-1920, according to the Electrical Index of Industry and Trade, compiled by the association. Great industrial activity, as indicated by the production of electricity, is shown for the entire region east of the Mississippi and north of the Ohio and Potomac rivers.

Preliminary reports indicate figures for April considerably in excess of those of March and reaching the highest level thus far attained by the Index.

The index, month by month for the last two years, stands as follows:

Electrical Index of Industry and Trade

	1927	1928	1929
January	104.9	103.2	109.0
February	103.8	104.7	107.9†
March	106.9	105.0	107.8*
April	106.8	104.6	111.9*
May	106.3	106.6	
June	106.1	106.0	
July	104.8	107.1	
August	104.9	108.9	
September	104.8	106.8	
October	102.6	109.0	
November	102.9	107.8	
December	103.1	105.0	

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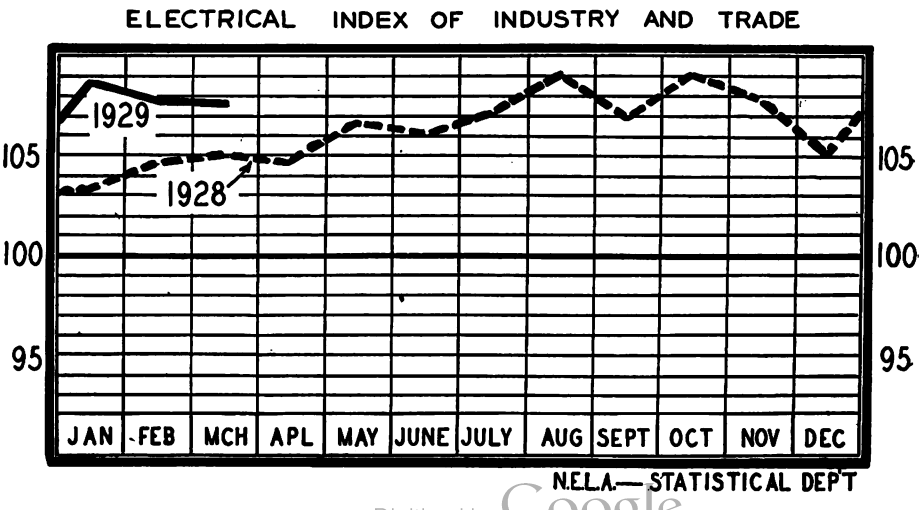
*Subject to revision. †Revised.

The N. E. L. A. Index of Industry and Trade is based upon the deviation of the total output of electricity by all agencies which contribute to the public supply plus imports from Canada, from a computed "normal" figure for each month, which "normal" is adjusted for the continued growth of the light and power industry and is further corrected for seasonal variation.



ENGINEERING SECTION

E. C. Stone, *Chairman* **H. S. Bennion**, *Director of Engineering, N. E. L. A.*

Inductive Coordination at Carrier Frequencies Under Study by Joint Committee

At the time of the formation of the Joint D. and R. Subcommittee in 1922, the use of carrier frequencies by either the power companies or the telephone companies was in an early stage of its development. However, its possibilities were recognized and a study of the inductive relations at these frequencies were included in the program of the committee together with the studies at fundamental and voice frequencies. The recent expansion of the use of carrier currents by both industries has fully justified this decision. The relatively few cases of interference involving carrier systems that have occurred show that the engineers engaged in the development of this art fully appreciate the necessity for inductive coordination. It has been recognized that for the present, while the art is in a state of rapid development, coordination of telephone line and power line carrier systems by frequency separation is the most practical solution. It is, however, becoming increasingly difficult on account of the present multiplying uses of carrier systems to completely avoid the use of the same frequency ranges for carrier systems on the two types of lines.

The problem of inductive coordination at 60-cycles and the lower harmonic frequencies faced the industries before any serious joint consideration was given to it and practices had become established which would not have been tolerated if the present knowledge had been available during the development of the art. In the case of carrier frequencies, it is believed, this condition will be avoided by the work of Project No. 9* without in any way hindering the development of the art.

The problem assigned to this project committee can be divided into three major parts: the first dealing with characteristics of power lines and equipment, the second with coefficients of induction, and the third with characteristics of telephone lines and plant. The solution of this problem requires a theoretical analysis of each part and the testing of the theoretical conclusions by actual measurements of the quantities involved.

At the time this committee was formed very little apparatus had been developed which could be used for this work and very little was known of the methods which were applicable to these measurements. Consequently, the early work of the committee was devoted almost entirely to studying methods of measurement, developing apparatus and testing it in the field. From this early work it has been found that for currents within the carrier range of frequency commercial current transformers with their associated secondary burden could be readily used for connecting the especially developed measuring apparatus to the power circuit. This part of the study was conducted at the Pittsfield Works of the General Electric Company, where a number of types of current transformers were available for tests.

Early in the investigation it became apparent that a method and technique of making measurements in the medium between the power and telephone systems, rather than interrupting either service to make measurements in these systems, was very desirable. Since the frequency band covered in this investigation extends from 5,000 to 80,000 cycles per second, it was decided to develop a magnetic field intensity measuring equipment similar to that already used in making measurements at radio frequencies. This equipment consists of a tuned loop connected to an eight-stage vacuum tube amplifier, the output of which is measured by an indicating meter. The voltage picked up and amplified by the tuned loop-circuit is measured by an eight-stage amplifier specially constructed for this work. Special anti-capacity switches permit the use of from three to eight stages in making measurements. Calibration curves for this amplifier show that the amplification is approximately uniform throughout the frequency range used in these investigations.

It has been found that with proper precautions in the design and operation of this equipment, no serious errors in the readings are produced by the presence of electric fields.

In addition to the tests which were conducted at Pittsfield this committee has utilized the system of the Utica Gas & Electric Company for an investigation, and is now conducting a study on an experimental line in New Jersey. The work done at Utica is covered in an engineering report recently issued by the Joint Subcommittee entitled "Study of High Frequency Currents in Power Lines Resulting from the Charging of Electrolytic Lightning Arresters."

The Utica tests made it very evident that, for the fundamental research on this problem, an experimental line was required which would be free from the influences of other overhead lines or underground metallic structures, and where all conditions at the time of test would be under control. A test location was therefore secured in the southern part of New Jersey and the necessary lines and equipment erected. The work which has been carried on there includes the following measurements at carrier frequencies.

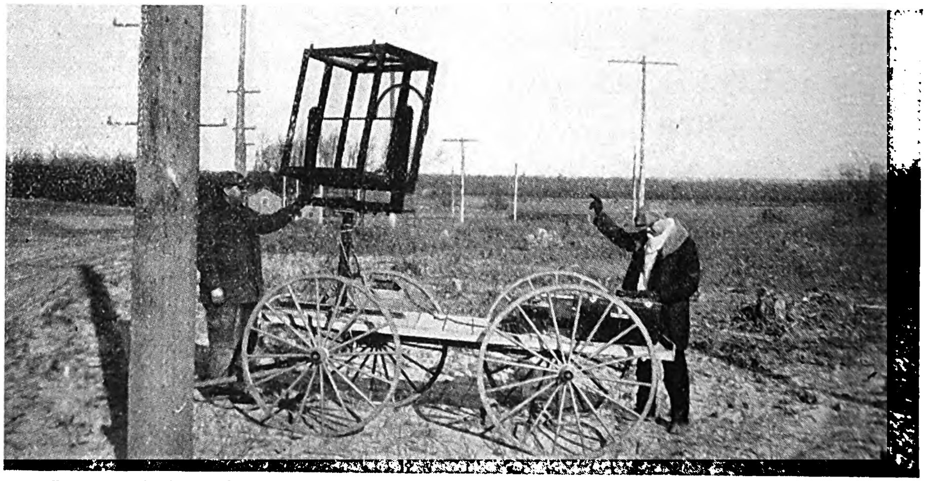
a. The magnetic field around a wire with ground return terminated in its characteristic impedence;

b. The magnetic field around a wire with ground return with reflections at the far end;

c. Residual current in a single wire with ground return;

d. The magnetic field between a telephone wire and ground.

A review of the program of the committee shows that much of the necessary work has been done in the study of the characteristics of the power system and of coupling coefficients, the third item,



Loop and Amplifier used to measure magnitude and direction of magnetic fields that of the characteristics of the telephone system will be taken up upon the completion of the present program of work.

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*Of the Joint Subcommittee on Development and Research of the Bell Telephone System and the National Electric Light Association.

Principles for Physical Relations of Circuits Adopted by National Electric Light Association and Western Union

THE Joint General Committee of the National Electric Light Association and the Western Union Telegraph Company has approved the report of its subcommittee of engineers appointed to investigate the general situation with respect to relations between electric light and power circuits of the N. E. L. A. member companies and communication circuits of the Western Union Telegraph Company, and recommends the general principles adopted for the solution of specific problems involving physical proximity between circuits of the two classes of utilities.

The subcommittee's report, which has been approved by the Joint General Committee, indicates that complete agreement exists as to standards of construction to be employed at crossings, conflicts and for all jointly used poles. As regards joint construction certain preferences between this and other forms of construction are given, as well as the general underlying factors that must be taken into consideration in applying such preferences. As to parallel construction, the general principles are recommended which show the way to a satisfactory solution of specific cases. In addition the subcommittee has included in its report certain principles to be applied in the solution of all the varieties of situations involving proximity.

The subcommittee of engineers has been instructed to continue with its work and prepare a more detailed set of principles and practices. A subcommittee on development and research has also been appointed to study the art of inductive coordination involving these classes of circuits.

As soon as standards of construction and operation are adopted the committee will undertake the determination of principles to aid in the fair allocation of costs of coordinative measures. In the mean time it is believed that with the cooperative spirit, which now is evident, a mutually equitable adjustment can and should be made in each specific case.

Copies of the report may be obtained from the National Electric Light Association, 420 Lexington Avenue, New York, N. Y., or from the Engineering Department of the Western Union Telegraph Company, 195 Broadway, New York, N. Y.

GEOGRAPHIC DIVISIONS and STATE ASSOCIATIONS

Southeastern Division Convention

THE Southeastern Division, N. E. L. A., Convention held at Asheville, N. C., May 8-10, attracted more than five hundred delegates with its fine program of addresses. Sports and entertainment offered in the mountain city added to the general enjoyment.

At the opening session President C. A. Collier pointed out the notable trend toward utility consolidation in the South and said that this made possible universal electric service in that region and permitted many economies in utility management. He said the utilities were doing a great deal to develop the industrial possibilities of the South. They should capitalize on this feature of their service and should also develop good will by cooperating in every progressive movement for improving the region industrially. He remarked that by "monopoly" was meant merely the privilege of giving service, but that the task of the utilities at present was to intensify and extend the service they rendered. Utilities are competing for customers' dollars with other industries, he said, and they must sell as well as produce.

Nap H. Boynton outlined plans for the celebration of "Light's Golden Jubilee" and urged the South to join in the tributes to Mr. Edison. I. M. Bailey of the North Carolina Corporation Commission made an able address on utility regulation. He pointed out the trend toward Federal regulation and urged that steps be taken to check this trend by developing to the fullest extent cooperation between State commissions and utilities that cross State boundaries. He believed there would be no necessity for Federal regulation if the utilities and the State commissions cooperated fully in solving the problems connected with diversified security holders, non-uniform practices and interstate energy sales.

A feature of the meeting was an address by James L. Madden, a vice-president of the Metropolitan Life Insurance Company. He announced the completion of an economic and industrial survey of the United States and Canada. This survey showed that during 1926 and 1927 in six Southern States 751 industrial plants changed locations. Of these 596 were added industries and 155 represented losses in industry. The survey showed that towns of from 4500 to 12,000 population gained the largest percentage of new industries. Of the 596 new plants, 402 represented industries developed locally, 80 were imported and 114 were branch establishments to take advantage of the market area. Labor was the primary reason given by all industries for locating in the South.

President Arkwright of the National Association paid a tribute to the rapid progress of the South. He said that the Southeast had led the nation in percentage of increase in production and use of electric power during the past five years.

Harry M. Hitchcock of *Printers' Ink* told the convention he thought the prime cause of misunderstanding between the power company and its customers was the fact that the power company considered itself a manufacturer while the customer looked upon it as a retailer. It was his opinion that advertising was the medium to weld the different viewpoints. Stewart L. Mims, vice-president J. Walter Thompson Company, with the use of slides presented the convention with certain of the information gleaned by that company in its market development survey for the electrical industry. Mr. Mims' talk ranged around "woman power" in the home, rather than man power in industry, and showed the market development possibilities in the homes already connected to central station lines.

Dr. Gus Dyer, dean of business economics, Vanderbilt University, in an able address, said that the people of this country were no longer afraid of "big business" because through customer ownership of securities big business was big only in the sense of the volume of business done. He touched also on the decentralization of industry and what this would mean to the Southeast. John G. Jones of the Alexander Hamilton Institute thought that the seeming decentralization of industry was really local development which was making new industrial centers.

Talks at the section meetings included one to the Engineering Section by L. W. W. Morrow, editor, *Electrical World*, on "Utility System Planning," and one by F. V. Andreae, Southern Manganese Corporation, concerning future growth in the field of electro-chemical industry. A. Edwin Fein addressed the Commercial Section on the subject of merchandising psychology, while Fred W. Herbert of the N. E. L. A. addressed the Accounting Section meeting. Miss Mamie Kennedy of the South Georgia Power Company, Albany, won the women's public speaking contest.

The following officers were elected for the coming year: President, T. H. Tutwiler, president Memphis Power and Light Company; first vice-president, H. E. Cox, Birmingham Electric Company; second vice-president, J. V. Strange, Carolina Power and Light Company, Raleigh; third vice-president, J. C. Guild, Tennessee Electric Power Company, Chattanooga.

Middle West Division Convention

THE seventh annual convention of the Middle West Division of the National Electric Light Association met at Omaha on April 24, 25 and 26. One day was given over to the meetings of section committees, all of which were well attended and aroused much interest.

From these meetings came reports of important developments and projects affecting the Middle West Division, among which were the power survey embarked upon by the Engineering Section and news from the legislative battle front of Iowa, Missouri, Kansas and Nebraska. This news indicated that, in spite of the apparently radical political tendencies of these states, legislation promoting government ownership and operation of electric utilities is not making much progress—contrary to the general impression created and fostered by the headlines in certain newspapers.

J. F. Owens, chairman of the Public Relations National Section, made a logical and forceful argument for continuing and extending the consideration of the human equation in all activities of the business. He stressed the necessity for careful selection of employees.

His long experience in the field of research made C. E. Skinner a well-qualified speaker on the value of research in the electrical industry. Mr. Skinner traced the progress of research from its beginnings in the devoted efforts of single individuals to the organized probing into the unknown that is carried on in the great laboratories of the present day. Too much satisfaction with American methods and practices was not evident in the address by A. D. Bailey, who spoke on electrification in Europe. Although American electrification is much greater than European in terms of magnitude and wide application, it would be a mistake not to recognize the importance of present-day European contributions and development in the electrical art, Mr. Bailey said.

N. H. Boynton outlined the plans which have so far been made for the observance of "Light's Golden Jubilee" in commemoration of the fiftieth anniversary of the invention of the incandescent lamp. Another prospective activity was treated by Paul Zimmerman, who spoke of the plans of the National Food Preservation Council, which will seek to inculcate a "national refrigeration consciousness" by concerted activity. On account of illness, Sam A. Baker, ex-Governor of Missouri, who was on the program, was unable to attend. In his address, which was read into the record, he stated his opinion that there should be a course of study in the public schools on public utilities and their service and relation to the public.

The extremes in precipitation and the wide seasonal variation in the flow of streams make it difficult to estimate the hydro-electric potentialities of the Middle West, said C. W. Place, in his address on that subject. He thought that there is a possibility for utilization of this power by coordination of its seasonal availability with established systems. However, the actual amount of such power is extremely small in comparison with the demands of the territory and its development remains far in the future. Kenneth McIntrye presented a résumé of the survey recently completed under the direction of the National Electric Sales Conference. The results are not such as to inspire any self-congratulation, indicating as they do a comparatively small domestic utilization of electric service.

These new officers were elected: President, A. E. Bettis, Kansas City, Mo.; vice-presidents, A. R. MacKinnon of Omaha, C. A. Leland, Jr., of Des Moines, and W. W. Austin of Cottonwood Falls, Kan. New officers of the Iowa Section, Middle West Division, were also elected, as follows: President, C. S. Macy, Des Moines; first vice-president, G. A. Neal, Sioux City; second vice-president, H. C. Orton, Dubuque; secretary-treasurer, H. E. Weeks, Davenport.

Southwestern Division Convention

RURAL electrification was declared to be the most important factor facing the electrical industry in the Southwest by J. G. Holtzclaw, president of the Southwestern Division, N.E.L.A., in his address before the division's annual convention in Hot Springs, Ark., April 30 to May 3. This convention was held jointly with that of the Arkansas Utilities Association. Six hundred members attended.

Mr. Holtzclaw said the farmer does not want to be subsidized, nor is he an object of charity, but he does want an even break on electric service, which means so much to his comfort and prosperity. Mr. Holtzclaw also discussed the use of long-time payments in selling merchandise, and stated that although the utilities desired to have all the sales outlets possible, the chief goal was to increase domestic use.

President P. S. Arkwright of the N.E.L.A. stressed the duty of utilities to bring to the public the advantage of electric service. He pointed to the fact that there is no middleman in the utility business and that the economic benefits and the comforts inherent in electric service can get to the public only through selling and advertising by the utilities. This is one thing that government ownership advocates neglect, Mr. Arkwright said, and the present electrification of this country has come about only because electric service has been sold to the users, often in competition with other services.

Other notable speakers at the convention were W. E. Bann, president of the Arkansas Utilities Association, who dwelt on the rapid growth of the Southwest; Charles W. Appleton, vice-president, General Electric Company; W. J. Hagenah, John V. L. Hogan, E. H. Sniffen, H. C. Couch and H. B. Flowers.

The several sections held meetings and discussed reports and addresses dealing with public relations, commercial affairs, engineering developments and accounting activities. A notable report by the competitive power committee of the Commercial Section covered detail power and load requirements for the major industrial plants of the Southwest.

Features of the Engineering Section meeting were the reports of the committees and the discussion of the address on system planning made by L. W. W. Morrow, editor *Electrical World*. There was agreement that utility advertising in newspapers was essential.

F. W. Insull of Tulsa, president Public Service Company of Oklahoma, was elected president of the Southwestern

Division, N.E.L.A. The new vice-presidents are H. C. Couch, president Arkansas Power & Light Company, Pine Bluff, Ark.; M. T. Walker, Southwestern, Gas & Electric Company, Shreveport, Miss.; B. E. Eaton, Mississippi Power Company, Gulfport, Miss., and Samuel E. Wolff, Oklahoma Power & Water Company, Sand Springs, Okla. E. E. Ehret was elected treasurer and S. J. Ballinger, San Antonio, Tex., reappointed secretary.

New officers for the Arkansas Utilities Association are: President, Robert E. Ritchie, Arkansas Power & Light Company, Pine Bluff; first vice-president, R. W. Curran, Little Rock, second vice-president, O. H. P. Moss, Blytheville; secretary and treasurer (re-elected), Rex I. Brown, Little Rock.

East Central Division Convention

THE convention of the East Central Division of the National Electric Light Association held at Louisville, May 7-10, offered an unusually fine program to the attending delegates.

Martin J. Insull asserted his faith in publicity as the means for laying the foundation of public understanding on which the utility industry must stand. Such publicity should cover every utility activity from the technicalities of production and distribution through management and finance. Consolidations and mergers are becoming so frequent as to be confusing and suspected, and complete candor on these operations is essential, Mr. Insull declared.

P. S. Arkwright, president of the N. E. L. A., reiterated the logical and well-expressed justification of the electrical utilities in the eyes of the nation. Managing Director Clapp followed Mr. Arkwright with a comprehensive picture of the contributions of the electric utilities to the prosperity and progress of the United States.

The accountant had his day in court through two able representatives, Dr. John T. Madden of the University of New York and J. H. Lobban of the Detroit Edison Company. Concerning machines for billing and other accounting duties Mr. Lobban said that their use was not necessarily desirable for economy but for speed, because the value of accounting information is essentially a news value existing here and now. Doctor Madden predicted the disappearance of the prejudice against non-voting common stock and the acceptance of this form of security for trading on the New York Stock Exchange within five years. He ridiculed the idea of utilility propaganda or any other interested effort affecting the opinions or teachings of educators.

In an excellent address Prof. A. G. Christie of Johns Hopkins University discussed "Power Generation, Present and Future." Professor Christie indicated the probable development of power-plant apparatus and devices in detail as they appear to him from present tendencies. A theoretical set-up, departing in only slight degree from ideas and equipment of the present, which would produce a kilowatt-hour for 8000 B.t.u. was thought by the speaker to be something that might be confidently expected reasonably soon. He predicted a lessening of the importance of vacuum for exhaust reception and said that higher entrance steam pressures would allow higher outlet back pressure and thus remove from steam operation the requirement of large volumes of cooling water. The processing of fuels for recapture of their byproducts and the extension of central-station services through the sale of steam for heating and industrial work are indicated in the near future. A better utilization of fuel through power interchanges between industrial concerns and central stations is also not far off.

In response to his own question "Can We Make Rural Electrification Pay?" Charles F. Stuart came forward with an emphatic affirmative. He said that rural service can now be talked about in terms of dollars and cents, as well as in terms of public relations, which until lately was the only language for it. The same optimistic feeling was shown by Dr. E. A. White, who said that complete rural electrification waits only on the general improvement of the farmer's economic condition.

Prof. G. W. McCuen of Ohio State University asserted that the trends toward mechanization in the development of farm operating practices are resulting in a decline of the ratio of farm to urban population. He presented a series of different rates for rural service and the prices per kilowatt-hour which would result from them as applied to the Ohio experimental lines. Although the different rates were very diverse in form and statement, yet in the final analysis there was comparatively small divergence between them in the actual prices per kilowatt-hour, particularly for large consumptions of energy.

National commercial plans and programs were explained by C. E. Greenwood, who asserted that electrical merchandise must be produced and sold with a price appeal to two different classes of buyers. In one class are those to whom price means little and who insist upon appearance and novelty. In the other and much larger class price is the most important consideration, but appliances made for this market must not be reduced in quality as affecting performance.

An address on the technique of salesmanship was made by W. R. Braasch, president of the Salesmanship Foundation. J. C. Langdell spoke on domestic electric water heating, holding that this load must be built up on the condition of off-peak service and rates and that for real volume in it the kilowatt-hour rate must be down to at least one cent. Public speaking as an activity for central-station employees was championed by W. S. Vivian, national committee chairman; E. H. Sniffen of the Westinghouse company said that no other thing had so good a domestic selling appeal as electric service and advocated intensive selling practices. Dr. J. Slepian, also of the Westinghouse Company, described the new Deion circuit breaker; H. M. Towne of the General Electric Company spoke on the development of the lightning arrester; M. F. Smalley, Ohio Power Company, presented an excellent paper on the rating of meter capacities to residential loads, and Alexander Maxwell spoke on wiring codes and standards.

Officers elected were: President, L. V. Herrington, president Kentucky Utilities Company, Louisville; first vice-president, C. H. Hartesty, Monongahela-West Penn Public Service Company, Fairmont, W. Va.; second vice-president, G. E. Miller, Cleveland; third vice-president, C. L. Proctor, Toledo (Ohio) Edison Company.

New England Division Elects Officers

AT the annual meeting of the New England Division N. E. L. A., held April 11, the following officers and executive committee were elected for 1929-1930, to take office on July 1, 1929:

C. H. Hodskinson, president; H. E. Duren, vice-president; W. C. Bell, vice-president; F. L. Ball, treasurer. Executive committee: G. S. Williams, Maine; W. A. Buttrick, New Hampshire; M. G. Clark, Vermont; E. S. Hamblen, Massachusetts; David Daly, Rhode Island; A. D. Colvin, Connecticut; I. W. Day (ex-officio), Connecticut; J. P. Alexander, Boston; T. S. Knight, Boston; K. L. Norris, Boston; W. G. Stretton, Woburn.

The fall convention will be held from Sept. 9 to 12, inclusive, at the Hotel Griswold, New London, Conn.

Joint Convention of Indiana Associations

By WILLIAM STOKES

SUBJECTS ranging from "Superpower Exists for the Local Customer" to "Obtaining Data on System Operation" and "Unaccounted for Gas" featured the three-day annual joint conventions of the Indiana Public Utilities Association, the Indiana Gas Association and the Indiana Electric Light Association at Gary, Ind., the first three days of May. Larger crowds than ever before have registered for the Indiana conventions were on hand for the various sessions which were held in the new and very modern Hotel Gary. The annual dinner of the three associations was held on Thursday evening, May 2.

The Indiana Gas Association, of which T. J. Kelly of the Northern Indiana Public Service Company, Fort Wayne, was president last year, was in charge of the first day's sessions on May 1. One of the distinguished guests present at the gas meeting was Oscar H. Fogg, president of the American Gas Association.

Papers presented by members of the Association and invited speakers were: "Unaccounted for Gas," by M. I. Mix, Peoples Gas Light & Coke Company, Chicago; "Water Heaters," by Stanley Jenks, Northern Indiana Public Service Company, Hammond; "Gas Refrigeration," by H. C. Wandas, Peoples Gas, Light & Coke Company, Chicago; "Industrial Furnaces," by A. F. Mitchell, Northern Indiana Public Service Company, Hammond; "A Message from Accounting Group A. G. A.," by L. D. Spragle, Interstate Public Service Company, New Albany; "Progress of Gas Engineering School," by H. C. Peffer, School of Chemical Engineering, Purdue University, and remarks by Oscar H. Fogg, New York, president of the American Gas Association.

C. L. Kirk, of the Citizens Gas Company, Indianapolis, was elected president of the Indiana Gas Association for the coming year.

Samuel Insull, Jr., president of the Midland Utilities Company, was one of the headliners on the program of the Indiana Public Utilities Association on May 2. Harland H. Allen of Halsey, Stuart & Company, of Chicago, addressed the convention on the highly interesting and timely subject of "The Financial Efficiency of the Utility Holding Company." "Is it Worth Saving?" was the subject of an inspiring address by James B. Wootan, editor of *Public Service Magazine* and *Public Service Management.*

The following utility men from the various branches of the utility industry in Indiana were elected to the board of governors of the Indiana Public Utilities Association for the ensuing year: C. H. Rottger and F. E. Bohn, to represent the telephone industry; C. L. Kirk and F. J. Haas, to represent the gas industry; H. S. Morse and W. H. Durbin, to represent the water interests, and N. A. Perry and T. F. English, the electrical branch of the industry.

M. S. Winder, Chicago, executive secretary of the American Farm Bureau Federation, was one of the principal speakers on the program of the Indiana Electric Light Association on May 3. Mr. Winder's subject was "The Farmers' Interest in Rural Electrification."

The various phases of women's activities, particularly in the field of home economics were discussed by Mrs. Vera Ellwood of the Milwaukee Electric Railway and Light Company. Mrs. J. R. Farrell of the Indianapolis Power and Light Company, chairman of the Home Service Committee of the State Association, also spoke to the convention on the work being done in Indiana.

Merchandising methods were discussed by F. X. Mettenet, general sales manager of the Northern Indiana Public Service Company, Central Indiana Power Company and Interstate Public Service Company, in a paper entitled "Cooperative Electric Specialty Merchandising."

"Obtaining Data on System Operation" was the subject chosen by D. J. Angus of the Esterline-Angus Company, Indianapolis, for his very interesting address to the convention.

C. V. Sorenson of the Central Indiana Power Company was elected president of the Indiana Electric Light Association for next year.

Changes in Southwestern Association Constitution

By E. N. WILLIS

AT a recent meeting, the governing body of the Southwestern Public Service Association made several changes in the Constitution, so as to permit and encourage even greater cooperation in the future, than in the past, with the various Associations with which we are affiliated.

Most important of these were provisions to waive separate conventions of this Association, and encourage attendance by our membership at suitable regional conventions of their craft; especially the Southwestern Division, Natural Gas Department, American Gas Association, and Southwest Geographic Division, National Electric Light Association. Provision will be made, however, to have group or sectional meetings, at such times and places as will be profitable to our membership, for any of the groups or sections which constitute the Association.

This Association will, as for the past 35 years, represent the interests of the gas, the electric, the street railway, and telephone public service companies, in Texas and Louisiana. In the absence of a full meeting of the Association, there has been substituted an Advisory Council, to consist of one representative from each of the member companies, which shall convene from time to time, for the consideration of the general affairs and policies of the Association, and elect an Executive Committee. The Executive Committee has full charge of the affairs of the Association, and elects from its number the president and three vice-presidents, and also elects the secretary and treasurer, which latter will not necessarily be members of the Executive Committee.

Officers and Executive Committee just selected for the year 1929-1930 are:

President, Knox Lee, Southwestern Gas & Electric Company, Marshall, Texas.

First Vice President, Chairman Gas Section, Frank L. Chase, Vice President, Lone Star Gas Company, Dallas, Texas.

Second Vice President, Chairman Electric Section, J. W. Carpenter, President, Texas Power & Light Company, Dallas, Texas.

Third Vice President, Chairman Railway Section, W. B. Tuttle, President, San Antonio Public Service Company, San Antonio, Texas.

Other members of the Executive Committee:

George H. Carter, Vice President, Texas Utilities Company, Marlin, Texas.

J. G. Holtzclaw, Vice President, Gulf States Utility Company, Beaumont, Texas.

W. L. Prehn, General Manager, Southwestern Bell Telephone Company, Dallas, Texas.

Treasurer, R. G. Soper, Vice President, Dallas Gas Company, Dallas, Texas.

Secretary, E. N. Willis, Dallas, Texas.

Great Lakes Division Elects Officers

THE annual meeting of the Conference Delegates of the Great Lakes Division was held in Chicago, on May 14, 1929, and the following Division officers were elected for the fiscal year beginning July 1, 1929:

Grover C. Neff, president; Eugene Holcomb, vice-president; L. B. Andrus, vice-president; John G. Learned, vice-president; Tom C. Polk, secretary-treasurer.

The annual convention of the Great Lakes Division will be held at French Lick Springs, Ind., on Sept. 26, 27, 28.

RURAL ELECTRIFICATION

Great Lakes Division Rural Electric Service Conference

By EUGENE HOLCOMB

Chairman, Rural Electric Service Committee, Great Lakes Division, N. E. L. A.

DEVELOPMENT of further appreciation of the possibilities of electric light and power service on the farms of America was the keynote of a comprehensive conference held in Chicago, March 22 and 23, under the auspices of the Rural Electric Service Committee of the Great Lakes Division, N. E. L. A. Representatives of operating companies, equipment manufacturers, farm organizations, and Agricultural Colleges were in attendance. This was the fourth of the series of such conferences being held in Geographic Divisions in cooperation with the Rural Electric Service Committee of the National Electric Light Association. The meeting was opened by Mr. J. E. Johnson, president of the Great Lakes Division, who stated that he was pleased to see the large attendance of the leading executives and representatives of the member companies of the Division, that much of the pioneer work of organized rural electrification had taken place in this Division, and that he hoped for a full and frank discussion of the problems presented. The Committee Chairman thereafter presided during the meeting.

The program was specially arranged to bring out various viewpoints under three general headings: 1—The Major Phases of Farm Electrification; 2—Developing Appreciation of the Possibilities of Electric Light and Power Service on the Farm, and 3—Selling Equipment to the Farmer.

That the electric power companies of the Great Lakes states, Michigan, Illinois, Wisconsin and Indiana, are beginning to make definite progress in the matter of providing and developing electric service for farms on a basis satisfactory to farmers and to utilities was evident from the interesting papers and the earnest discussions that featured the conference.

Real Advancement Made

The conference brought out unmistakably the fact that real advancement has been made toward solving the host of rural electrification problems, economic, technical and educational, that in the past have so bewildered the power companies and prospective rural customers. The old bewilderment, it was demonstrated, is giving way rapidly to clear-headed, forward-looking, constructive thinking. This thinking is being applied to construction, to rates, to research on the application of power to farm operations, to equipment, to selling, to service, to education.

Old problems remain and new problems are constantly arising, but active efforts are being made to settle them. And the efforts are bearing fruit. One by one the difficulties in the way to profitable farm electrification — profitable to farmer and to utility—are being whittled away.

"The Aims and Objectives of the Conference" were stated at the opening session on Friday morning, March 22, by Charles F. Stuart of the Northern States Power Company. Mr. Stuart declared that had the conference been held six years ago there would have been nothing to talk about, as the utilities knew little or nothing about the subject of electricity on the farm. "Today," he declared, "we have progressed to a degree which enables us to proclaim that we know considerable about it, this progress being due largely to our various experimental investigations."

"Six years ago," said Mr. Stuart, "less than 200,000 farms in the United States were being served by electric light and power companies. Now a count in about thirty states shows something like 360,000. The total in the forty-eight states, undoubtedly, is well over the 500,000 mark. This is an increase of at least 150 per cent in six years. Now that we know a great deal about this subject, the development and number of farms connected from now on will be at even a higher rate of speed."

Mr. Stuart touched upon the building up of an acceptable power load on the farm. "There is no way in the world" he declared, "to serve a farmer using only 300 kw-hr. a year under average conditions at a price generally acceptable to farmer and power company. When, however, the farmer gets up to 1200 kw-hr. a year the thing becomes a feasible, practical operation. That such a load can and is being developed is best evidenced by illustrations from more than forty states of actual farmers who are using in excess of 3000 kw-hr. a year. The load does not stop at 3000 kw-hr. but runs up among these examples to 50,000 kw-hr. and 60,000 kw-hr.

G. C. Neff, vice-president of the Wisconsin Power and Light Company, spoke on "Organization Work of the Rural Service Department." Mr. Neff declared, "A public utility company, operating in rural territory and supplying electric service to the farmers, cannot hope to be successful in this work unless those responsible for the operation of the company really believe that farm electrification can pay its own way, that there is a load on the farm sufficient in amount to justify the expenditure for required distribution lines, that the farmers can afford to pay the necessary charges for this service, and that they can profit by its use."

E. F. Kelly who appeared for J. Paul Clayton, vice-president of the Central Illinois Public Service of Springfield, told of the C. I. P. S. rural distribution system. He said that instead of extending distribution lines piece-meal to satisfy purely local needs as they came up, the company had worked out a definite distribution extension plan looking toward wiring to meet future needs of the system rather than to satisfy immediate requirements. When extensions are made to care for new customers they are made in accordance with this plan.

"Farm Rate Structures" was considered by Winsor Martin of the Byllesby Engineering and Management Corporation, Chicago. He presented the usual types of rate structure based upon getting an adequate return from each class of customers for the service given them. His paper developed the idea of a "compensatory return."

Future Load Building

In the discussion of this matter at various points in the conference, it was brought out that certain power companies which have been pioneering strongly in farm electrification have abandoned the immediate compensatory return theory in framing or revising farm rates in favor of a rate structure, looking to the building up of a future profitable load rather than to immediate paying farm business. This is particularly true in Michigan. It was explained by Miss Sarah M. Sheridan, vice-president and sales manager of The Detroit Edison Company, that this company has long had a rate which is the same for the rural customer as for the city customer.

Prof. H. J. Gallagher of Michigan State College, told of the new rural rates of the Consumers Power Company, which, likewise, give the farmer the benefit of the same rates enjoyed by his town relatives.

John G. Learned, vice-president, described the demonstration farm of the Public Service Company of Northern Illinois at Mundelein, Ill.

M. S. Winder, secretary of the American Farm Bureau Federation and chairman of the Committee on the Relation of Electricity to Agriculture, outlined the advancement that has been made in the electrification of farms in Michigan, Wisconsin, Illinois and Indiana. He expressed appreciation of the efforts of central stations to reach the farmers. He pleaded for a program of real cooperation and understanding among all the factors of the rural electrification equation to the end that electric service might as rapidly as possible continue to be extended to end farm drudgery and help to bring to agriculture its share of prosperity and higher living standards.

Developing Appreciation and Possibilities

The symposium on "Developing Appreciation of Possibilities of Electric Light and Power on the Farm," was opened by Miss Sarah M. Sheridan, whose subject was "Farm Electrification from the Standpoint of the Sales Executive."

Miss Sheridan told of the study made by The Detroit Edison Company in the matter of devising cheaper line construction for the farm lines. Under the new method adopted, poles are placed 300 feet apart and aluminum wire is used. The farmers seeking line extensions secure a private right-of-way for the line, which will avoid expensive tree trimming. The company offers to build farm lines at $1,000 a mile with an allowance of $100 for each original customer connected at the time the line is built and allow $60 to the original customers for each additional customer after the line is built. In 1928, under this arrangement, The Detroit Edison Company built more than 300 miles of line and took on 2200 new farm customers.

Miss Sheridan pointed out that the farmer, as a rule, wants electricity for lighting. He has to be sold on the use of it for power purposes.

"We have two necessities," she said, "the necessity of making the business profitable if possible, and the finding of the means of making it profitable. We must influence equipment manufacturers and appliance manufacturers to put on the market good appliances that can be sold at prices within the reach of the farmer."

Professor H. J. Gallagher, of Michigan State College, in charge of farm electrification research and development, told of the demonstration truck being used in Michigan to carry the possibilities of farm electrification to rural communities.

The truck was purchased and equipped with funds provided by The Detroit Edison Company and Consumers Power Company. It is being used throughout agricultural Michigan in the extension work of the Michigan State College.

"The 1928 extension program consisted of 30 demonstrations in 20 different counties with a total attendance of 2275 farmers, an average attendance of 76," Professor Gallagher said. "Demonstrations were also conducted at two farm picnics with an attendance of 10,000; Michigan State College Farmers' Day, 5000 attendance; Ingham County Fair, 2000 attendance; and the Michigan Implement Dealers' Association, 500 attendance.

"Having personally conducted these demonstrations, I am convinced that the first important step in rural electrification is presenting the rural rate schedule to the farmer in such a manner that he thoroughly understands the basic structure and full operation of the rates. The second educational step is presenting the possibilities of farming operations done with the small power unit."

C. V. Sorenson, sales manager, of the Central Indiana Power Company, spoke on "The Fountain (Ind.) County Plan."

The aim of this plan is to give the farmer a proper appreciation of what electricity can do for him. Under its operations the county agent, the county farm bureau, and the two power companies giving service to Fountain County unite to study various problems involved in farm electrification. The general committee in charge of the movement includes farm bureau members, managers of each of the two power companies, and the rural service man of one company, with the county agent as chairman. The chairman of the Indiana Electric Light Association, Rural Service Committee and the project leader of the State agricultural college also meet with the committee. At the meetings there is a discussion of some practical uses of electricity on the farm by the project leader of the agricultural college. A general discussion is held and reports are made on the work of the county. The county agent also organized a series of 16 township meetings.

Mr. Sorenson said: "An indication of what progress may be expected is given by an analysis for 1928 of the accounts of 69 farmers in this territory who are now using electric service. Five are using from 500 to 1000 kw-hr. per year. Seven are using from 1000 to 2000 kw-hr. per year. One used 3000 kw-hr. in 1928, one used 4200 kw-hr.

John H. Flessner, farm service agent of The Detroit Edison Company, told of the exhibits of his company at fairs and various gatherings of farmers. Two tents were needed to house these exhibits at fairs and picnics in 1928. The exhibits included farm equipment powered with electricity and also various appliances for use in the farm home.

Mr. Flessner declared that "eastern Michigan fair managers have come to look upon the farm electrification display as one of the big attractions of their fairs and they welcome it accordingly."

"Individual Demonstrations of Certain Applications as a Means of Developing Appreciation of Electric Service for the Farm," was discussed by E. R. Meacham of the Wisconsin Power and Light Company, Madison, Wis.

"The best rural demonstrations," he said, "do a great deal more than show the machine or how it works. To be of greatest value the demonstration must give to the man who watches it a new conception of how the electric service will satisfy his own conditions and of the advantages it may bring him in convenience, comfort, safety, labor and money. For that reason such a demonstration should be just as complete as to accessories and surroundings as possible, and should be conducted under conditions that are typical for the locality; that is, right on the farm itself. This is what distinguishes a demonstration from an exhibit and makes it such a valuable method of developing an appreciation of the possibilities of electric service."

He described the methods used by his company in demonstrating electric ranges, motors for threshing, filling silos, etc., feed grinders, and so on.

Press Anxious to Help

C. V. Gregory, editor of the *Prairie Farmer,* Chicago, declared that the agricultural press of the country is ready and anxious to do all it can to promote the use of electric power on the farms of the country. Editors of farm papers realize that through the application of electric power to farm operations and to farm homelife, farm efficiency and farm prosperity can be promoted, that higher standards of living can be enjoyed, and that the lot of the farmer and the farmer's family can be made much easier and much happier.

Professor K. L. Hatch of the University of Wisconsin College of Agriculture, Madison, Wis., dealt with the subject "Possibilities of Electric Power on the Farm from the College Extension Service Standpoint." He said in part:

"The advent of power on the farm, particularly in the form of electric current, affords the largest single opportunity for immediate and permanent improvement of living conditions. With power available, running water wherever it is needed, is the next step. With running water available, bathrooms and sewage disposal naturally follow. Then there are electric lights, the power washer, the vacuum cleaner, and electric refrigerator. Given these improvements, the farm home is the equal of any to be found in the city. These are vital reasons why the extension worker should show the possibilities of electric power on the farm."

Truman E. Heinton, of the Agricultural Engineering Department of Purdue University, spoke on "The Rural Service School." He said: "There are now available from experiment stations in the United States results of investigations which, in my opinion, are sufficient to justify the electrification of a majority of the farms in Indiana, Illinois, Michigan and Wisconsin. If the farmers living on this majority of farms were well informed of these experimental results there would be little use of meeting today to discuss means of developing an electrical consciousness on the farm. Since these farmers are not well acquainted with the facts established by investigations, many agencies are now concerned with developing an appreciation of the possibilities of light and power service on the farm. Of greatest importance in this development, in my opinion, are the rural service men of the electric light and power companies."

Mr. E. Van Arsdel, president of Interstate Public Service Company, Indianapolis, Ind., treated the subject from the standpoint of the Electric Light and Power Company.

"A rural electrification consciousness must be developed within the personnel of the power company," said Mr. Arsdel. "It must also be developed among farm leaders, and in order to insure a full measure of future success it is necessary that they view this problem not only from the standpoint of present development, but also with reference to the possibilities of future development in the matter of increased application of electricity to farm operation."

Selling Equipment to the Farmer

The second symposium of the conference was on "Selling Equipment to the Farmer."

L. M. Williams, Commercial Manager of the Wisconsin Power and Light Company, spoke on "Analysis of Territory from Sales Standpoint." He dwelt upon the activities along the line of territorial and market analysis of the Wisconsin Power and Light Company. The territory of the company covers 12,500 square miles. Data from the Wisconsin State Department of Agriculture shows that in this territory dairying is a major pursuit. "Therefore," said Mr. Williams, "we conclude that water pumping equipment, milking machines, feed grinders, silo fillers, electric refrigeration for milk cooling should be of a great deal of assistance to our farmers. We find, too, that egg production is high, and, therefore, electric incubators, brooders, and lighting the hen house should be received favorably by the farmers, especially the farmers' wives."

Mr. Williams declared that the analysis shows the type of crops produced by the farmer and the appropriate time when he receives checks for his produce. "Knowing this, the company is able to time its selling campaigns to interest the farmer when he has money to spend."

"How and What Equipment to Sell to Farmers and Type of Salesman" was discussed by J. R. Campbell, Attica Electric Company, Attica, Indiana. He said: "In selling electric equipment to farmers, we get a direct contact with the small household appliances. Every housewife is more or less familiar with what we have to offer, and there lies the appeal to the husband. On the other hand, the utility salesman must create a desire in the farmer to want equipment that will utilize electric energy in volume—for volume utilization of electricity ultimately means success for both farmer and utility. More or less low pressure salesmanship should be used.

Douglas Dow, farm service advisor of The Detroit Edison Company, handled the subject "Dealer Cooperation." He told of experiments being made by The Detroit Edison Company in the direction of securing efficient and practical equipment for the farmers at the lowest possible cost. "In our opinion," said Mr. Dow, "the function of merchandising is to increase revenue by increasing consumption. We are not interested in making a large profit on the sale of equipment. We are more interested in selling equipment that will stay sold and continue in use without further attention on our part than we are in profiting from the initial sale.

"We found ourselves between the two horns of the old dilemma of doing our own selling or working through the dealers.

"A survey showed there were 185 dealers or electrical contractors selling some or all of the desired equipment. In a few cases we found that the dealers were active. However, in a great majority of cases we found the dealers were backward, apathetic, or seriously hampered by their financial arrangements. In many cases they were trying to sell the wrong kind of equipment or perhaps had tried to sell it, found it didn't work, and decided that this electricity stuff was just another line of hokum and they weren't going to burn their fingers twice. In some cases we found the dealers strongly antagonistic. Certainly we could not depend entirely on the dealer."

Mr. Dow then told of the Detroit Edison Company's experience in marketing equipment and said in conclusion: "As I stated in the beginning, this is an experiment and we do not recommend that any of you try it without giving it very careful consideration and studying the possible difficulties due to unusual conditions in your own territory. If you will wait for another year, we may be able to tell you a great deal more about it. However, if any of you wish to try this or a similar plan we shall be more than glad to give you the benefit of what experience we have had to date and tell you in more detail some of the problems that have come up from time to time in applying this method."

J. C. Myers, president of the National Association of Farm Equipment Manufacturers, spoke on "Selling Equipment to the Farmer from the Standpoint of Equipment Manufacturers," and urged that the merchandising of farm equipment be left in the hands of manufacturers and dealers.

J. F. McCarthy, of the commercial department of the Central Illinois Public Service Company, concluded the symposium on "Selling Equipment to the Farmer" with a paper on "Farm Wiring." Mr. McCarthy said:

"Rural Service Departments are faced with this situation: when the customer installs an adequate wiring system, there is usually very little available money left with which to purchase energy consuming equipment, and when an inadequate wiring installation is made, the customer is dissatisfied with the service, and there is no foundation on which the company can build volume load. They should, therefore, proceed on a quality basis and go as far as possible, and ultimately they will attain the desired objective. It is essential that a liberal payment plan for wiring installations be inaugurated by the companies, and an extensive program developed to educate the farmer to the advantages of an adequate wiring system."

The concluding feature of the conference was a summing up of its papers and discussions by Dr. E. A. White, director of the Committee on Relation of Electricity to Agriculture.

Dr. White emphasized the great strides that have been made within the past several years in taking electric power to the farm and adapting it to the uses of the farmer.

At the opening session Mr. Tom C. Polk, newly appointed secretary-treasurer of the Great Lakes Division, N. E. L. A., who assisted the chairman in organizing the conference, was introduced to the delegates. He welcomed them to Chicago and assured them of the interest of his office in helping in the development of electric service for the farm.

The conference adjourned at noon on Saturday, March 23.

Many of the delegates spent the afternoon at the model farm of the Public Service Company of Northern Illinois at Mundelein, Ill.

National Rural Electric Project Progressing

WIRING is now in progress on the five demonstration farms of the National Rural Electric Project near Washington, according to Geo. W. Kable, director of the undertaking. One installation on the farm of J. W. Jones near Olney, Md., is completed. All of the outdoor wiring on this farm is underground, including a 1200-foot-high tension line from the highway to the transformer pit at the center of distribution.

The five farms of the National Project represent different types of agriculture. One is a dairy farm, one is a fruit farm, another produces eggs, the fourth is a livestock farm, and the last makes a specialty of high-class baby chicks. These are just average farms. Some of the buildings have been standing fifty years and more. All of the farms are in the Sandy Spring community, one of the oldest organized farming sections in the country.

Preliminary work started on the National Project last summer. Under the direction of Mr. L. C. Prickett, farms were selected on which to install demonstration equipment. Since that time these farms have been under close observation and study to learn everything possible of the economic and sociological conditions prior to electrification. These studies are in charge of the project economist and sociologist, Mr. B. B. Powell. In addition to farm business analyses and cost of production studies, they include sociological and fatigue investigations to be used as one method of measuring results of using electricity in the farm home.

The lighting recommendations for the farms have been made by a committee composed of W. C. Brown, of the National Lamp Works; J. J. McLaughlin, of the Westinghouse Lamp Company, and A. D. Bell, of the Edison Lamp Works. The layouts represent the best judgment of these experts as to what constitutes good wiring for the farm.

With the assistance of Miss Eloise Davison of N. E. L. A., the United States Department of Agriculture and Home Economics Department of the University of Maryland, the farm kitchens are being rearranged to accommodate the electrical equipment.

About seventy manufacturers have offered cooperation in equipping the farms. The equipment for the most part will be that which has been found practical for farm use. A few experimental installations of water heaters and certain other pieces of equipment will also be made. Most of the equipment will be loaned to the farmers, subject to purchase.

All of the steps in the development of the project are being recorded photographically. Motion pictures are also being taken to show the transition from hand to power methods.

Careful studies of the present and future needs, as well as opportunities for improving present practice, are being made before equipment is selected and installed.

In addition to the demonstration farms, a program of research has been undertaken. Eventually this is to be the major work of the project.

Tests with the electric plow have been in progress since last fall. Several fields were plowed and planted to grain, and physical and chemical tests of the soil have been made. It is still too early to give results of the method, but they are encouraging enough to warrant continuation of the investigation for another season.

The demonstration farms are located about fifteen miles north of Washington, in the vicinity of Laurel and Olney, Md. The project office is in the Agricultural Building on the campus of the University of Maryland, eight miles north of Washington on U. S. Highway No. 1.

WOMEN'S COMMITTEE

MISS SOPHIA MALICKI, *Chairman* MISS ISABELL DAVIE, *Secretary*

News Letter

BY MRS. THELMA VAN NESS

DURING the last three years, the Women's Committee has sponsored several short courses in electrical household equipment which have been held at various home economics colleges over the country for the benefit of women in the electrical industry who are interested in the increased use of electrical household equipment.

The courses are designed to give information which will aid women in considering the problem from the standpoint of the relationship of good sales to the homemakers' use of our products.

The courses consist of lectures on many phases of homemaking and the subjects which are of especial interest to the students and laboratory work on household equipment. During the course the students are given an opportunity to use the equipment. Time is also given for the viewing of equipment on display by manufacturers that is not in use in the laboratories.

In March, two such short courses were held. One was held at Oklahoma A. & M. College, Stillwater, Okla., which was attended by about 75 women from the Southwest and was sponsored by the Southwestern Geographic Division Women's Committee. An interesting feature of this course was the Public's Open Night, to which were invited the townsfolk to view the exhibit of electrical equipment. The other course was held at Purdue University, Lafayette, Ind., sponsored by the Women's Committee of the Indiana Public Utilities Association. A report of this was given in the May N. E. L. A. BULLETIN.

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The Home Economics Department of Iowa State College, Ames, Iowa, offered during the week of May 27 a course similar to those which it held in 1927 and 1928. Special classes in planning, arranging and equipping home service kitchens were held in answer to many requests.

* * *

Announcement is made of the short course in electrical household equipment for home service directors, to be offered for the third time by Teachers' College, Columbia University, New York, N. Y., from July 29 to Aug. 16, 1929. The morning sessions will be under the direction of Prof. C. J. Lynde and the afternoon meetings will be arranged by the National Electric Light Association. Additional information can be secured by addressing Prof. C. J. Lynde, Teachers' College, Columbia University, New York, N. Y. This course will be preceded by a three weeks' course on gas and gas household equipment.

* * *

More than seventy members of the women's division of the Electric Association of Chicago registered for the short course which was conducted to acquaint them with the origin and application of electricity. The course included a lecture on the generation of electricity, with working model, given at the Electric Club, April 2; a lecture on wiring and lighting, with working model, at the Club, April 9; demonstration of washing machines, ironers and refrigerators at the Electric Shop of the Commonwealth Edison Company, April 16; demonstration of table appliances at the Public Service Company model home in Oak Park, April 23, and a demonstration of electric ranges at the factory of the Edison Electric Appliance Company, April 27. The course was open to all members of the women's division on payment of a $1 registration fee.

* * *

According to *The Looking Glass,* reflecting the activities of the Electrical Women's Round Table of Greater New York, the month of April marked one of the most important events of the electrical year—the annual Appliance Conference of the Metropolitan Home Service Committee, N. E. L. A. Miss Helen Farlow, chairman, worked for months to make this event one of value. The conference was held on one day of each of three weeks instead of three days in succession, as heretofore, at the Home Making Center, Grand Central Palace. Each day's program was filled with interesting subjects from 9.30 a. m., until late in the afternoon.

* * *

The Women's Committee of the Illinois Northern Utilities Company—Miss Edna Decker, chairman—is holding a series of four meetings this year, designed to carry to the women employees a general analysis of gas and electric service in the home. At the first meeting in January, Miss Helen McKinlay of the Edison Lamp Works gave a splendid talk on the fundamentals of lighting for the home and its decorative possibilities. The second meeting, which was an all-day affair, was scheduled for the latter part of April and covered laundry equipment. The lectures and demonstrations were given in the company's general office in Dixon, Ill., by Miss Delphine Lerschen of the Federal Electric Company, Chicago.

* * *

The chairman of the Women's Committee of the Portland, Ore., Electric Power Company, Miss Marguerite Butler, served as hostess for one of the luncheon meetings of the Business and Professional Women's Club in April and was also elected a member of the executive board of the Portland Women's Club.

* * *

Soon accidents will have no terrors for many of the girls of the Portland Electric Power Company as quite a number have taken the Red Cross First Aid Course. Two members of this Women's Committee, Miss Anne Inglis and Miss Betty Taylor, qualified Red Cross lay instructors, not only assist with the Portland classes but have also spent every Friday evening this past winter in Salem, Ore., helping to instruct classes there. Another member, Miss Louise Johnson, is also assisting in the instruction of the Portland classes.

* * *

Miss Mamie Kennedy, South Georgia Power Company, Albany, Ga., was the winner in the Southeastern Division Women's Committee speaking contest for the year 1928-1929. The subject for the contest was "How a Woman Employee Can Help Her Company Merit the Confidence of its Customers." Miss Kennedy was judged the winner in a competition held at the Asheville convention between all speakers who had won State contests. The other State winners were Miss Elsie Lee, Birmingham Electric Company, representing Alabama; Miss Louise Brooks, Florida Power & Light Co., representing Florida, and Miss Cullie Clark, Nashville Railway & Light Co., representing Tennessee.

* * *

The State of Oklahoma Women's Committee was the winner in the Efficiency Contest sponsored by the Southwestern Division Women's Committee.

* * *

Announcement is made of the appointment of Mrs. Jean Roberts, home economics advisor for the Tucson Gas, Electric Light and Power Company, as the first State chairman of the Women's Committee in Arizona.

* * *

The 1929 Essay Contest of the Women's Committee, Public Relations Section, Pacific Coast Electrical Association, has for its subject, "The Women's Committee—An Asset to the Utility." There are cash prizes and the contest is open to each member of the Women's Committee in public utilities affiliated with the Pacific Coast Electrical Association. Mrs. Ruth E. Creveling is chairman of this group.

* * *

Mrs. Nell Laws, chairman of the Northwest Division Committee, reports a very interesting and successful midyear meeting at Walla Walla, Wash. It was decided to recommend to Mr. W. H. Ude, chairman, Public Relations Section, the subject "Pleasing Mr. and Mrs. Public" for the 1929 Essay Contest to be sponsored jointly by the Women's Committee and the Committee on Employees' Relations with the Public. Discussion at this meeting brought out the following general program suggestions: (1) From time to time it has been found wise to review the aims and purposes of the Women's Committee; (2) Regular electrical current event topics by the members and short talks on "Why I Find My Job Interesting" have been found to be valuable additions to programs; (3) Talks by local representatives of "Better Business Bureaus;" (4) Speakers from local Women's Committee of Banking Institute; (5) Book reviews on suitable books by representatives from local public library.

One of the most interesting reports given at this meeting was that of the Bellingham, Wash., committee, Puget Sound Power & Light Company, stating that executives from large local industries have been asked to speak to the girls, explaining the particular application of power in their own plants. A series of such meetings has been planned.

The Eastern Oregon Light and Power Company Women's Committee, through Miss Irma Thiessen, chairman, reported a telephone canvass of all range customers of the company to learn whether the ranges and service were satisfactory. In only 11 out of approximately 300 calls were any grievances found and these were adjusted. This committee holds an "at home" in the company offices, both in LaGrande and Baker, once a month when the customers and other friends of the company are invited to the office and appliances are demonstrated. Refreshments prepared at the demonstration are served. These "at homes" have become an institution and have made many friends for the company.

* * *

Miss Thelma Kelly, chairman of the Pacific Power and Light Company Women's Committee, recently accepted an invitation from the Federated Clubs of Moro, Ore., to give a talk and demonstration on electric ranges, refrigerators and other appliances. After her talk which was very well received, Miss Kelly served electrically frozen dessert to 80 persons.

* * *

The Women's Committee of the Northwestern Electric Company, Portland, Ore., of which Mrs. A. W. Angell is chairman, is doing some very progressive work. A number of range demonstrations have been given and a program was arranged by the committee for all Portland Parent Teachers' Associations at which the company illuminating engineer gave a talk.

* * *

The Women's Committee of the Appalachian Electric Power Company at Charleston, W. Va., was hostess at a benefit bridge held at the Women's Club recently. Charleston's committee is also responsible for editing a new paper entitled *Elec's Hi-Lites*, giving the details of each meeting, the program for the coming month, new recipes and anything of interest to the women employees.

* * *

The Idaho Power Company Women's Committee—through Miss Gertrude McDevitt, chairman—reports a cooking school soon to be conducted for the whole committee. This committee is very active in public speaking classes. Mrs. McDevitt appeared before the Century Club of Nampa, Idaho, recently and the Whitney Progress Club of Whitney, Idaho.

* * *

The Portland Electric Power Company is holding a series of Women's Committee meetings in which the girls themselves take a very active part. At one meeting, the attendance of which was 103, fifteen women took part in the program, and at a subsequent meeting of 120 women, eighteen women made up the program.

* * *

The girls of the Women's Committee, Wheeling (West Virginia) Electric Company, have been asked to help with the Associated Charity drive in that city.

* * *

Miss Margaret Schneider, chairman of the Wheeling Electric Company Women's Committee, reports a safety meeting held recently at Wheeling, W. Va. The girls of the Bellaire, Moundsville, Dillonvale and Barnesville offices were guests of the Wheeling organization. Mr. H. E. Crain, safety director, gave a talk on safety and public relations, using as a subject "Do We?" The men of the organization put on a little skit entitled a "Radio Review" and a motion picture entitled "The Verdict" completed the program. The committee in charge of the program for the day was Miss Minnie Seevers, chairman, and Misses Nellie Niebur and Verna Evans.

* * *

Miss Susie Pyott, chairman Women's Committee, Appalachian Electric Power Company at Bluefield, W. Va., reports that her committee is planning to take a three months' course in safety and first aid.

* * *

At Fairmont, W. Va., the Monongahela West Penn Public Service Company Women's Committee has been holding some very interesting meetings. At one meeting the wives of the executives were in charge of the social hour after the meeting.

The March number of the Grays Harbor Railway and Light Company magazine, Aberdeen, Wash., was edited by the Women's Committee, the girls having complete charge of all details of this activity.

* * *

In connection with an educational exhibit sponsored by the Illinois Power Company during the convention of the Illinois State Electric, Gas and Electric Railway Association in March, the Women's Committee of the Illinois Power Company assisted Mrs. Edith Clift Meyers in serving waffles and coffee. Mrs. Meyers is director of home service for Landers, Frary and Clark. Invitations were mailed to all members of the Springfield Women's Club, inviting them to visit the display, and waffles and coffee were also served to this group.

* * *

Miss Angie L. Watts, Illinois State chairman, reports a very successful Women's Committee meeting in connection with this convention.

* * *

The Women's Section, Empire State Gas and Electric Association held a splendid two-day meeting at Ithaca, N. Y., May 2 and 3. Miss Helen Smith, Rochester Gas and Electric Company, Rochester, N. Y., is chairman of this section.

MAGAZINE ARTICLES

BELOW IS A LIST of articles which appeared in various magazines recently that are especially interesting to Women's Committee members:

Good Housekeeping—May
- The Hot Water Supply—T. L. Henderson.

Woman's Home Companion—May
- All in the Day's Mail—Anna Steese Richardson.
- Creative Housekeeping — Earnest Elmo Calkins.

McCall's Magazine—May
- Plan for Refrigeration — Marcia Mead.

Woman's World—June
- The Nervous System of Your Home —Dahy B. Barnett.

Sunset Magazine—May
- A Versatile Tool is the Electric Cooker—Ella Lehr.

Delineator—May
- What One Hundred Women Say About Dish Washers.

Better Homes and Gardens—May
- It is a Joy to Sew the Modern Way —Mary Brooks Picken.

Pictorial Review—May
- Selecting Equipment Wisely—Mildred Weigley Wood.

Modern Priscilla—May
- Science and the Household Refrigerator—M. E. Pennington.
- Smart Gifts for Her Table.

SURGES AND FLASHES

By FRED W. HERBERT
Director, Service Department, NELA

The day is not far distant, possibly here now when a woman must take a course in Mechanical and Electrical engineering to qualify as a good housewife.

* * *

These are enervating days. The feet are easier than the mind to get on a desk and the fishing and golf visions predominate.

* * *

Don't think that a man is a millionaire just because you see him putting on a million airs.

* * *

Is the pen mightier than the sword? Did you ever hear of poets and writers ever getting pensions?

* * *

How to escape being gored by an angry bull. Avoid going where an angry bull is likely to be.

* * *

Precedent at a dinner isn't so important to us as to get ahead of the line at the ticket window.

* * *

Sunshine blinds a lot of folks temporarily but moonshine gets more permanent victims.

* * *

An old fable tells of an ass disguising himself in a lion's skin. Was this the origin of calling a college diploma a sheepskin?

* * *

The men who try to do something and fail are infinitely better than those who try to do nothing and succeed—Lloyd Jones.

* * *

Laugh often even if you don't have anything to laugh at for it is a great aid to digestion.

* * *

Reckless driving will either take you somewhere in a hurry or in a hearse.

* * *

When a woman goes up in the air she usually lands on her husband.

* * *

Trials and tribulations. Prohibition has both.

* * *

Education never comes as a bequest, it is always an achievement.

* * *

A single camphor tree yields above $5000 worth of camphor. A single camphor ball will feed 5000 moths.

* * *

You will never find the splinters when climbing the ladder, but they are always there when you are sliding down.

* * *

We have just heard of a new invention. Rubber dishes in artistic designs. Will not break or nick. Can be thrown at your wife without harm to either.

* * *

In order to eliminate curves millions of dollars are spent each year in this country by railroads and overweight girls.

SPECIAL COMMITTEES

More Light on Light*

THE electrical industry has devoted much thought and care to making electric lighting as efficient as possible. The ideal of highest efficiency can only be attained when lamps, wiring, and central station service are at their best. If the lamps are inefficient, the wiring inadequate or the service voltage low, the desired efficiency is not realized.

Highest practicable efficiency for incandescent lamps is assured through a comprehensive system of testing which has this as part of its object.

Building and house wiring is very generally inadequate. When fully loaded serious voltage drops are likely to be encountered between the service entrance and lamp sockets as a result of which the public loses the advantage of the full lighting to which it is entitled and the unit cost of the illumination which it does obtain is rendered higher.

When, as sometimes occurs, the central station voltage at the service entrance is lower than that intended the public suffers further deprivation in its lighting and the central station sells less current than it should.

The chart in Fig. 1 shows the well known relation between the light output of incandescent lamps and voltage. It also shows the relation of lamp life to voltage. Although with lower voltages the lamp life increases rapidly the saving in lamp renewals by no means compensates for the reduction in light output and efficiency.

Another cause of inefficient lighting which has been found to be not uncommon is a tendency for dealers in some sections to sell lamps of higher voltage rating than that of the service. In one mid-western city in which this subject has been studied recently it was found that practically all the lamp agents were selling 115-volt lamps although the company operated at 110 volts and itself sold 110-volt lamps. These dealer lamps were found to come largely from nearby cities in which 115 volts were standard. Wherever the public obtained lamps from dealers their lighting results suffered. In the same city 1500 voltage readings at service entrances during lighting hours showed the operating voltage to be about 110 volts, not more than 1 per cent being either above 115 volts or below 105 volts.

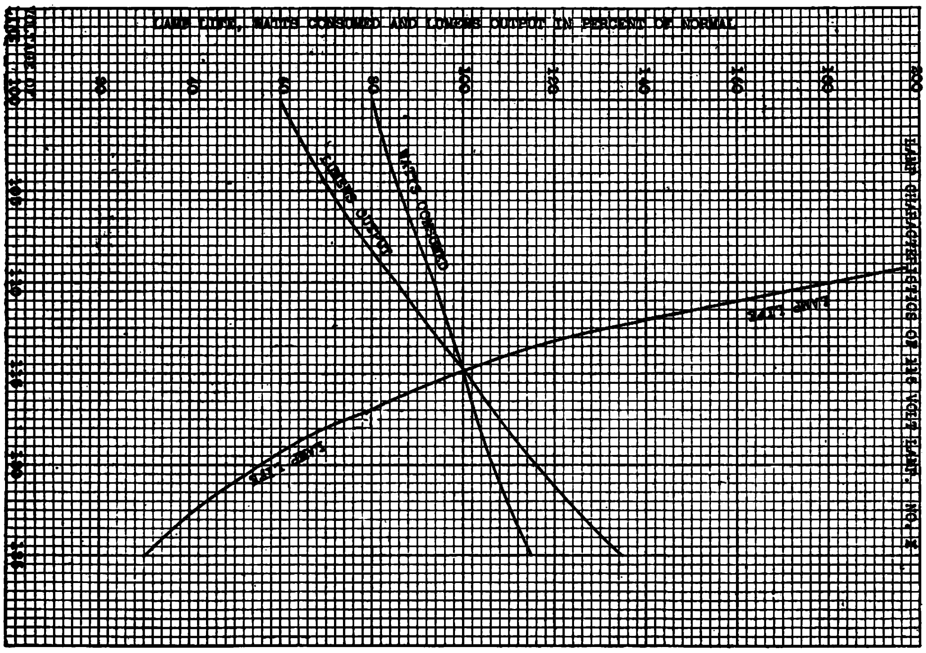

Fig. 1

Relation between light output of incandescent lamps and voltage

In another city in the Mid-West it was found that the voltage at service entrance during lighting hours averaged somewhat below the standard operating voltage. In this city the voltages of lamps in the stocks of dealers were found to be various; none of them, however, being as low as the actual operating voltage and some of them being either five or ten volts higher. In this case, due to the low central station voltage the conditions were aggravated with the result that losses to the public and to the central station were of a serious order. The chart in Fig. 2 indicates the reduction in wattage brought about by low voltage applied to the lamp.

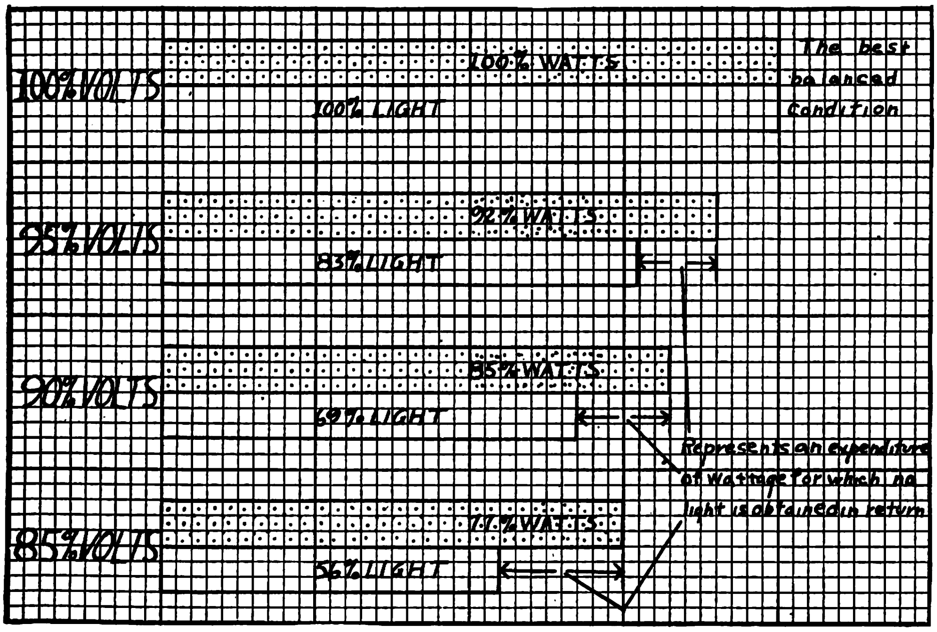

Fig. 2

Wattage reduction brought about by low voltage applied to the lamp

We need more light on our lighting load, to impress upon the central stations the importance of knowing their voltage and of taking their voltage data at the lamp socket rather than at the service entrance. Most utilities make allowance for voltage drop, but none of them make enough allowance.

Whatever may be the cause of low voltage operation of lamps it ought to be remedied.

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*Contributed by the Lamp Committee, Frank W. Smith, chairman.

WHAT OCCURRED LAST MONTH

Agricultural

The State Corporation Commission of Virginia is expected soon to promulgate rules and regulations for electric utilities which will include a plan for further extension of electric lines into rural sections. Governor Byrd recently appointed a special committee to study a farm electrification plan for Virginia and a subcommittee has also been working on the rule which the State Corporation Commission is to adopt.

* * *

Coal

A publication of the World Power Conference, issued in London, reveals a drop of 400,000,000 tons annually in the use of coal and a world movement toward electrification. The use of oil, of water power resources and the scientific combustion of low grade fuels, are causes of the decline in the use of coal.

* * *

Consolidations

With the organization of the International Hydro-Electric System as a subsidiary of the International Paper and Power Company, the Canadian Hydro-Electric Corporation and the New England Power Association are under one control.

* * *

It was announced on May 21 that the Associated Gas and Electric interests have acquired all of the public utility operating properties formerly controlled by E. L. Phillips and his associates in up-state New York.

* * *

Merger of eleven Tennessee electric and gas concerns owned by the Doherty interests into the Tennessee Central Service Company is under way, according to dispatches from Tennessee.

* * *

Purchase of several electric properties in southern Alabama by the General Water Works and Electric Corporation of Delaware, whose offices are in New York, is announced. The property serves about twenty small communities.

* * *

Earnings of Public Utilities

Gross earnings of public utility enterprises in March, exclusive of telephone and telegraph companies, as reported to the Department of Commerce by ninety-five companies or systems operating gas, electric light, heat, power, traction and water services and comprising practically all of the important organizations in the United States, were $195,000,000, as compared with $194,000,000 in February, and $187,726,994 in March, 1928, according to a Department of Commerce announcement. Net earnings for March are given at $85,000,000, as compared with $72,811,146 in March, 1928.

* * *

Federal Trade Commission Investigation

On May 2, James Pollard, secretary of the Light and Power Association of California, testified before the Federal Trade Commission concerning activities of his association, which he declared has spent $100,000 a year for the past two years. A. E. Wishon, secretary of the association until February, 1927, was also a witness.

* * *

On May 10, witnesses before the Federal Trade Commission were William Lavarre and Harold Hall, who told of loans of $870,000 received by them from the International Paper and Power Company for financing the purchase of the Augusta, Ga., *Chronicle,* the Columbia, S. C., *Record,* the Spartanburg, S. C., *Herald,* and the Spartanburg, S. C., *Journal.* They also testified concerning negotiations for the purchase of other papers which did not come to any result. Mr. Lavarre stated that the International Paper Company had made no attempts to influence the editorial policies of his newspapers, nor had it any connection whatever with the editorial management of the Hall-Lavarre publications.

* * *

On May 11, Samuel S. Wyer of Columbus, Ohio, was the only witness before the commission. Mr. Wyer told of professional surveys and analyses made by him of various problems of interest to public utilities. These included studies which he made of the Ontario Hydro, Muscle Shoals, and other projects. Mr. Wyer's survey of the Ontario Hydro was issued as a document of the Smithsonian Institution and this fact was the subject of questioning by Judge Healy for the commission. Much of the material in the survey was gained from a study of findings by a Canadian Royal Commission, Mr. Wyer testified. He said that his more recent publications have been issued under the auspices of the Fuel-Power-Transportation and Educational Foundation of the Chamber of Commerce of Ohio. These relate to the fertilizer problem, the St. Lawrence waterway and other matters.

* * *

On May 15, the Federal Trade Commission sent its Fourteenth Interim Report on the investigation to the Senate. This tells of examination by accountants of accounts of operating companies in two important holding company groups, of the sending of accountants to another holding company, and of field work on the relations between utility companies and service organizations completed at the office of one of the important management groups.

* * *

On May 15, witnesses before the commission were Frank E. Gannett of Rochester, N. Y., publisher of a chain of seventeen newspapers; S. E. Thomason of the Bryan-Thomason Newspapers, Inc., and Edwin Jeffries, president and business manager of the Greensboro, N. C., *News.* The testimony of these witnesses was concerning financing of newspaper purchases by the International Paper and Power Company. Mr. Gannett stated that the International had no influence whatever over the editorial or news policies of his papers, and Mr. Thomason testified to the same effect. Mr. Gannett also testified concerning his complete repayment of the money lent him by the International. Mr. Jeffries was examined briefly concerning efforts of William Lavarre and Harold Hall to acquire his paper, these efforts leading to no result.

* * *

On May 16, the following four witnesses were examined by the Federal Trade Commission: Richard Grozier, owner and publisher of the Boston *Post*; Frank D. Comerford, president of the New England Power Association and vice-president of the International Paper and Power Company; Channing Cox, former governor of Massachusetts and a director of the Boston *Herald* and *Traveler,* and N. C. Head, assistant to the president of the International Paper Company and vice-president of the International Paper and Power Company.

Mr. Grozier told of negotiations by Charles O'Malley, advertising agent of Boston, with C. B. Carberry, managing editor of the *Post,* concerning purchase of the *Post.* Mr. Carberry declared that Mr. O'Malley indicated that he was representing Insull interests and said he was authorized to offer $20,000,000 for the *Post.* Mr. Carberry, according to Mr. Grozier, did not take the offer seriously and Mr. Grozier looked upon the matter in the same way.

Messrs. Comerford, Cox and Head testified concerning the financial interests of the International Paper and Power Company in newspapers.

* * *

On May 17, Charles O'Malley was a witness before the commission. He denied emphatically that he had ever claimed to represent Insull interests in his negotiations concerning the Boston *Post.* His negotiation had been the result of an inquiry by a stranger who claimed to represent financial interests in New York and Chicago, he declared.

Other witnesses at the hearing were R. B. Chandler, publisher of the Mobile, Ala., *Press,* which began publication last April; T. M. Stevens, a Mobile attorney, and D. P. Bestor, Jr., president of the First National Bank of Mobile. These witnesses testified concerning establishment of this paper and declared that there was no connection between its establishment and the Alabama Power Company or other utilities.

* * *

On May 20 and 21, Senator Norris delivered a long address in the Senate, going exhaustively into the evidence presented at hearings of the Federal Trade Commission and displaying his usual opposition to the course and conduct of the utilities.

* * *

On May 22, Senator Walsh of Montana offered a resolution calling the attention of the Attorney-General to testimony before the Trade Commission and sworn statements to the Post Office Department concerning ownership, said to be in conflict with the testimony before the commission, and asking the Attorney-General "to take such action as may be appropriate."

* * *

On May 23, Thomas M. Stevens, attorney, of Mobile, Ala., testified before the Commission concerning the founding of the *Mobile Press* which began publication last April. He denied charges that power interests were financially interested in the *Press.* He declared that the paper was started with no direct or indirect affiliation with power interests, although power officials, because of continued unfair attacks by Mobile papers, had conferred concerning establishment of a new paper.

* * *

On May 24, Senator Walsh of Montana, introduced a resolution calling for an investigation by the Federal Trade Commission of all industrial and commercial combines having outstanding securities in excess of $20,000,000 which have been effected during the past four years.

* * *

On May 28, the Commission announced that Colonel Ira C. Copley, owner of newspapers in California and Illinois, who requested that he be permitted to testify, would appear as a witness on June 13.

* * *

Hydro-Electric

The Federal Power Commission on April 26 announced indefinite suspension of its order, approved Feb. 28, which would have brought under control of the commission security-issues of licensees and their subsidiaries. This suspended order was to be effective if the utility was "developing, transmitting, distributing or using power in a State which has not authorized and empowered a commission or other agency, or agencies, within such State to regulate and control the amount or character of securities to be issued by such licensees," or if any part of the power entered interstate commerce and reached a State which has not provided such regulatory authority. On April 29, Secretary Good, chairman of the commission, said that the commission expects to study the situation more carefully and see whether the public is properly served under the present system.

* * *

On April 29, the Federal Power Commission announced that nine applications for permits for licenses had been filed during the month ended April 25, bringing the total number of applications received since the creation of the commission to 982.

* * *

The Private Bills Committee of the Canadian House of Commons has refused a request from the Dexter P. Cooper Company for an extension of time for two years in which to commence its proposed tidal power project on Passamaquoddy Bay, between the Province of New Brunswick and the State of Maine.

* * *

A second 25,000 horsepower generator has been started in the Bryson, Quebec, hydro-electric plant of the Gatineau Power Company, a subsidiary of the Canadian Hydro-Electric Corporation. The total capacity of the plant is 75,000 horsepower.

* * *

A dispatch from Erwin, Tenn., tells of a $1,000,000 hydro-electric project for the Nolichucky River, which is to supply Erwin with electric current.

* * *

On May 6, Commissioner of Reclamation Mead presented to Secretary of Interior Wilbur the plan of an economic survey of undertakings of the Reclamation Bureau, which the Bureau will make this summer in order to determine the present status of its activities. The plan was approved by Secretary Wilbur.

* * *

The Bracken Government, in power in the Province of Manitoba, has been given a clean bill of health by the commission which investigated the charges of corruption against the Administration in connection with the lease of the Seven Sisters Falls to a private company.

* * *

The California Legislature adjourned without adopting bills calling for construction of works involved in the $124,000,000 coordinated water program, which includes irrigation, hydroelectric and flood-control projects. The proposed $30,000,000 dam at Kennett, on the Sacramento River, is one of the features of this program. The Legislature did authorize expenditure of $450,000 for engineering surveys during the next two years in connection with the proposed program.

* * *

The New England Power Association has let a contract for a huge earthern dam at Monroe, New Hampshire, upon which work will begin within the next few weeks. The dam is one unit of a $40,000,000 project in that section. It will create a lake eight miles long and, it is estimated, will develop 200,000 horse-power.

* * *

Production of Electricity

According to the United States Geological Survey, total production of electricity in the first quarter of 1929 was 23,633,000 kw-hr., an increase of 11 per cent over the output for the same period in 1928. Quantities given are based on the operation of all power plants producing 10,000 kw-hr. or more per month, engaged in generating electricity for public use.

* * *

Railway Electrification

A bill has been introduced in the Illinois State Senate providing for a legislative study of electrification of all the steam railway terminals in Chicago.

* * *

Rates

Morris Llewellyn Cooke, director of the Pennsylvania Giant Power Survey under former Governor Pinchot, has sent an open letter to the Federal Power Commission which is critical of the present rate structures of electric utilities, particularly contending that the domestic consumer pays too great a percentage of the total utility income.

* * *

Directors of the Worcester, Mass., Electric Light Company, at their first meeting since ownership of the company passed to the New England Power Association, voted to withdraw from the Worcester rate case.

* * *

The Public Service Commission of Oregon announces that the investigation into the power and light rates prevailing in Portland will be undertaken before any study is made of the request for a 10-cent street car fare. An investigation concerning valuation on which rates in Portland are based is also being made under the direction of the Portland City Council.

* * *

On May 17, the Philadelphia Electric Company filed with the Public Service Commission of Pennsylvania a new schedule of rates under which residential consumers of electricity in Philadelphia and Delaware County will save about $900,000 a year. The new rates are to go into effect on June 15.

* * *

The Public Service Commission in Maryland is investigating rates prevailing in a number of towns of the Eastern Shore district.

* * *

The California Railroad Commission has asked sixteen California utilities to appear before it in June to show cause for the rate of earnings in 1928, the commission claiming that these are too high.

* * *

On May 27, the Public Service Commission of Maryland began hearings on rates for gas and electricity in Baltimore. The People's Counsel of the City of Baltimore announced his intentions to seek a very large reduction with the greater part of it benefiting the residential consumers.

* * *

Regulation

A bill proposing a tax not over one-fourth of 1 per cent of the gross revenues of public utilities for the support of the Public Service Commission of Missouri has been postponed indefinitely by a vote of the Missouri House.

* * *

On May 8, Senator Couzens, chairman of the Senate Committee on Interstate Commerce, in opening hearings on a bill introduced by himself to create a Federal Communications Commission to regulate radio, telephone, telegraph and cables, said he will introduce an amendment to the bill proposing Federal control of utilities engaged in interstate commerce.

* * *

The last session of the New Hampshire Legislature enacted several laws increasing the power of the Public Service Commission in its regulation of electric utilities. One law gives the commission jurisdiction over contracts between one utility and another. The commission is also authorized to limit, as well as permit, export of current from the State. Limitations on security issues are also provided for, and provision is made for the appearance of the attorney-general before the commission in matters where public interest requires, and permitting him to employ experts and assistants.

* * *

The Governor of Michigan has signed the amended Rushton Bill which requires gas and electric utilities to secure a certificate of convenience and necessity in certain cases, but excludes municipal corporations from the provisions of the act.

* * *

The Michigan Senate has passed a bill providing for the incorporation by any two or more cities, villages or townships, or any combination or parts of these, of a metropolitan district, or districts, comprising territory within their limits for the purpose of acquiring, owning and operating, either within or without their limits, parks or public utilities for supplying sewage disposal drainage, water, light, power or transportation.

* * *

Before its recent adjournment the Nebraska Legislature passed a bill permitting municipal utility plants to extend service fifteen miles beyond city limits where contracts have been secured that show a gross profit of 15 per cent. The bill has been signed by the Governor. The Governor has also signed a bill which permits urban and rural communities to create hydro-electric distribution districts.

* * *

A movement initiated by the Legislative Committee of the Maine State Grange seeks to invoke a referendum on the bill by which the last session of the Maine Legislature granted a restricted right of eminent domain to electric companies with respect to their transmission lines.

* * *

The Joint Committee on Rules of the Massachusetts Legislature has recommended passage of a resolution calling for investigation of activities of power interests in the State by a special commission of one Senator, three Representatives and three persons to be appointed by the Governor. The resolution proposes an appropriation of $25,000.

* * *

A bill has been introduced in the Florida Legislature to create a State Utilities Commission, which would have jurisdiction over electric companies, rates, etc. It is proposed that the present Railroad Commission be consolidated with this Utilities Commission. The bill calls for an excise tax from which municipal utilities would be exempt.

* * *

The special session of the Texas Legislature has acted adversely on the proposal to create a State Public Utilities Commission. This is in accord with the Legislature's attitude at the regular session. Another special session is to be called in June and it is reported that Governor Moody may once more lay the public utility measure before the Legislature.

Public Policy Report

(*Continued from page* 338)

the furnishing of data to schools and colleges come relationships with those who use it. Such contacts are proper, natural, necessary and desirable for all concerned, if informational service is to be efficient. The relationship necessitates a high standard on both sides. It is inconceivable that the industry should refuse any reasonable request for information helpful to those engaged in public instruction. It is improbable that teachers in our schools or instructors in our universities would accept for their use any material which is not truthful, accurate and valuable, even if an attempt were made to foist the opposite character upon them. The whole question of cooperation and relationship between education on the one hand and commerce, business and industry on the other is one of common concern, by no means confined to the utilities. It involves practically every great American industry. The methods must be finally determined by the educational authorities. The electric industry has always cooperated with them in the fullest degree. It desires to continue to do so. It hopes that in the near future a more definite basis for that relationship will be worked out and declared by those responsible for educational methods. The industry expects to conform with their final policies.

The electrical industry has long been recognized as a leader in research. In the laboratories of the electrical manufacturers and in the field experimentation of the operating companies there has been ceaseless search for new truths, added applications and further harnessing of this great instrument for the benefit of mankind. This effort has been rich in rewards, shared not alone by the electric industry and its customers, but aiding other industries and reaching into the lives of all the people. With the formulation of the great program for stimulation of pure science research, under the direction of the National Research Council, the National Electric Light Association, in behalf of the electric light and power companies, is glad to announce its full participation in the movement. The National Electric Light Association thus confirms its confidence in the body of men devoting their lives to research who have already given so much and who have in their hands the unfolding of a richer future.

Ours is a responsibility for bringing to the American people the best electric service at lowest possible cost which human capabilities can accomplish. To this end the Association and its members rededicate themselves.

Picked up from

ELECTRICAL NEWS ITEMS

Issued weekly by Department of Public Information, National Electric Light Association, 420 Lexington Avenue, New York City. All or part may be used without further notice and with or without credit being given.

Electrical Domestic Appliances on the Farms

TWO-THIRDS of the electrified farms have washing machines according to an analysis of a survey recently completed by *Woman's World.* This is a higher percentage than that shown for the urban homes surveyed by the same publication and represents the response of the farmer to the solution of one of the most irksome tasks of the housewife.

Five per cent of the farms have electric refrigerators—the same ratio as urban homes—while 10 per cent have electric ranges, as against only 7 per cent in the towns studied.

The complete list of domestic appliances in the 529 farms which reports the use of electricity is as follows:

Washing machines, 350 or 66 per cent.
Vacuum cleaners, 220 or 42 per cent.
Curling irons, 197 or 37 per cent.
Toasters, 185 or 35 per cent.
Fans, 72 or 14 per cent.
Electric percolators, 66 or 13 per cent.
Electric grills, 53 or 10 per cent.
Electric ranges, 52 or 10 per cent.
Heaters, 50 or 9 per cent.
Electric refrigerators, 24 or 5 per cent.
Electric fireless cookers, 12 or 12½ per cent.

Of the appliances purchased, 11 per cent were procured from the local light and power companies, while 47 per cent were bought from dealers in the nearest home town.

A further item of interest is the reporting of 1189 farms with radio sets, of which 94 or 8 per cent are operated from the electric light socket.

Electricity to Aid Tunnel Building

ELECTRICITY will play a vital part in the construction of the gigantic new tunnel which will be built for the purpose of adding to New York City's water supply. This tunnel will be 20.2 miles long, 17 feet in diameter and will be at a depth of about 500 feet below sea level.

Compressed air for drills and shovels will be furnished by synchronous, motor-driven compressors of 400 horsepower. As the muck is removed it will be hauled through the tunnels to hoists by storage battery mine locomotives, of which there will be 62. Sixteen electric mine hoists will carry it to the surface.

At present New York City uses 875 million gallons of water per day. The distributing system has long been recognized as inadequate for future needs and even today is not large enough to maintain suitable pressure in the Boroughs of Brooklyn and Queens.

We Point with Pride

THE first commercial incandescent lamp consumed about 100 watts and was rated to give 16 candle power horizontally, the equivalent to about 170 lumens. It blackened considerably during its life, the average amount of light throughout life being about 65 per cent of initial. It sold for $1.25 and was considered one of the marvels of the age.

The present average lamp is rated at 690 lumens (the equivalent of about 69 candle power), its average lumens throughout life being 93 per cent of initial. It thus gives over five times the amount of light given by the lamp of 1881 and consumes about 40 per cent less current. Its list price is 20 cents, less than one-sixth that of the 1881 lamp.

Inasmuch as current costs about one-third of what it did in the early days of electric lighting, it can now be said that, roughly speaking, five times the amount of light is obtained for about 20 per cent of the cost or the same amount of illumination can be obtained for about 4 per cent of the cost.

This is a record of improvement of which the light and power industry can be justly proud.

Electrically Operated Razor

ELECTRICALLY operated apparatus, such as hair clippers, vibrators, sterilizing machines and instruments for dressing women's hair have been used for some years in barber shops and beauty parlors. Now we are told by Colonel Jacob Schick, of the Magazine Repeating Razor Company, that an electrically operated bladeless razor has been perfected.

This new razor is based on a combination of shearing and nipping by rapid vibration at a very high speed of the inner of two parallel, slotted, shearing plates. According to the announcement, "the apparatus is only slightly larger than the safety razors now in general use and can be attached to an ordinary lighting socket. . . . The inner plate vibrates 7200 times a minute and nips off the hair as it falls in through the outer slotted plate.

"No matter how hard the bladeless razor is pressed, it is impossible to cut or injure the skin and it can be safely operated by a child without any possibility of injury."

Hotel Guests Undisturbed

AN extension to the Chalfonte-Haddon Hall Hotel in Atlantic City was recently erected, swiftly and noiselessly, without disturbing the guests of either hotel, or the residents of the cottages in the neighborhood. This achievement, free from the nerve-racking din of riveting hammers, was made possible by the use of electric arc welding. The actual structural work was completed in a month's time.

The time is rapidly approaching when steel construction will cause no more annoyance than the laying of a brick wall.

Moon Comes In

"PUSH button and moon comes into room." This sentence is a translation of what a surprised Eskimo said when he first saw the electric light. The incandescent lamp, according to the annual reports of the Royal Canadian mounted Police, is the latest toy of the "Children of Twilight."

Modern inventions travel to the far corners of the earth. Many of the Eskimos have heard the phonograph, a few have heard the radio and there are some that even have seen the airplane. Now, to their amazement, here is a light that needs no oil, a light that burns steadily, an ideal accessory for the long twilight; provided, of course, that there is always electricity to make the lamp burn.

Making Hay Without Sunshine

MAKING hay without sunshine is one of the 200 uses of electricity developed by Borlase Matthews, pioneer in the application of electricty to the needs of agriculture, according to an Associated Press Dispatch from London.

"He has an 'electric farm' of 600 acres in Sussex and is developing a scheme for electrification of rural Lincolnshire, over an area of 1280 square miles, with a capital of $5,000,000. He has received a special order from the electricity commission for his project.

"Matthews is convinced that farmers in England are keen to develop the use of electricity, examples of which he quotes as electric threshing, electric plowing, electric churning and use of ultra-violet rays for poultry and pigs."

THE REVIEWING STAND

Outline of Fundamentals of System Interconnection

Serial report, Electrical Apparatus Committee, Engineering National Section, N. E. L. A., Publication No. 289-60, 12pp. Price 15 cents; to members, 10 cents.

PROBABLY no single engineering feature of the industry is of so much interest to utility executives as the subject of interconnection. Certainly in no other single way can such sweeping benefits and signal economies be effected with minimum capital expenditures as by a sane and reasonable process of neighborly cooperation.

While the report does not attempt a universal solution, it does clearly and comprehensively state the problems involved in interconnection, outlines the methods of attack and should serve as a valuable guide to procedure in approaching any interconnection project. The report does not blithely dismiss the difficulties that are bound to arise. It does, however, very clearly indicate that they are not different in character from the problems which are met and solved internally in any of our large systems.

It is suggested in the report that it is possible to operate utilities under separate ownership to effect the same economies that would result were the ownership common. Granted that both parties to an interconnection must benefit, and that the benefits may be either in dollars or "in kind," and granted further that both parties are approaching the problem with openness of mind, there would seem to be no essential difficulty in making such common adjustments as are necessary to contractual understanding. Executives will appreciate that a meeting of minds as between nieghboring utilities need not be any more difficult than is mutual understanding and agreement between the varied interests internal to each.

Engineers will welcome this report as an index and outline of procedure. Executives will find it an excellent summary of the questions they may wish to ask of their engineers.—*J. C. P.*

Treatment of Feed Water

Serial report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-53, 20pp., 6 illustrations, 10 tables. Price, 30 cents; to members, 20 cents.

A SURVEY of the central station industry to determine the general practice in the treatment of feed water and the results obtained by the various methods is the basis of this report. Forty statements by operating companies are included which describe various methods of treatment of feed water. The use of evaporators is reported by 24 companies, chemical treatment is used by 9 others, 3 companies use Zeolite and 4 report no treatment.

The results of various tests are set forth in tabular form. Statements by several manufacturers are included. Recent Zeolite installations of high-pressure boilers, typical Permutit continuous boiler blow-off installations and acid and phosphate feed installations also are given in tabular form.—*E. S. B.*

Filing Corporate Documents

Serial report, General Records Committee, Accounting National Section, N. E. L. A. Publication No. 289-63, 8pp. Price 15 cents; to members, 10 cents.

THE problem of keeping information of a corporate nature safely, properly indexed and readily available is one that faces every central station company. How this can be done most efficiently is explained in this report.

The need for a "Department of Documents" for filing the companies' numerous and important documents, such as franchises, right-of-way, licenses, permits, etc., is briefly outlined. The how-to-do deals with such subjects as: Selection of filing equipment, assignment of document numbers, indexing of documents, the tickler card system, routine payments, chattel mortgages and receipt for loan documents.—*E. S. B.*

Health Promotion in the Public Utility Industry—Its Necessity and Importance

Serial report, Industrial Relations Committee, Public Relations National Section, N. E. L. A. Publication No. 289-56, 16pp. Price, 15 cents; to members, 10 cents.

BECAUSE the health of all the staff of an industry is extremely important to the industry's success, this report is of interest to all public utilities. "Aside from humanitarian reasons," states the report, "it is of particular interest to the public utility to help its employees lengthen their lives."

Practical suggestions on "How the Medical Department Can Be a Factor in the Reduction of Absenteeism from Work" are given under Appendix 1. A second appendix deals with the "Opportunities Which All Companies Have to Control Absenteeism by Care in Ventilation."

The matter of organized effort to care for the health of employees is one which no industry executive can afford to overlook. Sickness, the report states, is responsible for approximately 8 days' absence per employee per year.

Attention also is called to other reports of N. E. L. A. committees in which references are made to the problem of health in the public utility industry.—*E. S. B.*

Diesel Engine Power Costs

Serial report, General Power Committee, Commercial National Section, N. E. L. A., Publication No. 289-38, 7pp. Price 25 cents; to members, 15 cents.

THE new report on Diesel Engine Power Costs is a worthy supplement to the original report of the Power Committee which has been found so useful by power engineers and salesmen.

This report is purely a supplement and is intended to be used with the original report, as no data has been repeated; all information being on new stations or on subsequent operation of older stations covered in the original report.

It is remarkable how closely the costs listed in the later report check with those given in the original. The general setup of material has been somewhat changed, so that it is now possible to obtain segregated costs on many individual items.

The plants covered include small units which would ordinarily be found in industrial applications, and also the larger units designed for central station use. Mechanical drive units are also covered in detail.

The figures shown in the report are truly representative of the various types of oil engine installations which are apt to be encountered by the power engineer.

The costs are based on a detailed study of a large number of plants actually in operation, and for this reason the report forms a background which is practically essential to the successful power engineer or salesman.—*A. B. M.*

New Developments in Auxiliary Testing Equipment

Serial report, Meter Committee, Engineering National Section, N. E. L. A. Publication No. 289-57, 40pp., 80 illustrations, 1 table. Price 55 cents; to members, 35 cents.

THIS report, describing further new developments of auxiliary equipment essential to the Meter Department, supplements previous material of this nature prepared by the Meter Committee and published in the "Handbook for Electrical Metermen" and in other serial reports.

In addition to illustrating and describing available new material from various manufacturers, this report con-

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***Statistics Committee**—Harry A. Snow, The Detroit Edison Co., Detroit, Mich.

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***Section's Executive Committee**—Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

***Commercial and Industrial Power and Heating Bureau**—V. M. F. Tallman, Charles H. Tenney & Co., Boston, Mass.

Commercial Cooking Committee—O. Wilhelmy, The Union Gas & Electric Co., Cincinnati, Ohio.

Electric Truck Committee—Guy W. Thomas, Public Service Co. of Colorado, Denver, Colo.

General Power Committee—H. C. Thuerk, Erie Lighting Co., Erie, Pa.

Industrial Heating Committee—J. L. Faden, The Edison Electric Illuminating Co., Boston, Mass.

***Lighting Bureau**—T. O. Kennedy, The Ohio Public Service Co., Cleveland, Ohio.

Commercial and Industrial Lighting Committee—J. Daniels, The Edison Electric Illuminating Co., Boston, Mass.

Electrical Advertising Committee—C. J. Eaton, Middle West Utilities Co., Chicago, Ill.

Home Lighting Committee—W. T. Blackwell, Public Service Electric & Gas Co., Newark, N. J.

Street Lighting Committee—R. J. Malcomson, Public Service Co. of Northern Illinois, Chicago, Ill.

***Merchandising Bureau**—Frank D. Pembleton, Public Service Electric & Gas Co., Newark, N. J.

Domestic Electric Range Committee—F. A. Coupal, Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.

Merchandise Sales Committee—C. L. Harold, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

Refrigeration Committee—C. L. Dunn, The Ohio Public Service Co., Cleveland, Ohio.

Water Heating Committee—Norman T. Wilcox, Stone & Webster, Inc., Boston, Mass.

***Customer Relations Committee**—H. T. East, Public Service Co. of Northern Illinois, Chicago, Ill.

Promotional Rates Committee—E. W. Lloyd, Commonwealth Edison Co., Chicago, Ill.

***Wiring Sales Committee**—A. P. Good, Commonwealth Edison Co., Chicago, Ill.

ENGINEERING NATIONAL SECTION

***Section's Executive Committee**—E. C. Stone, Duquesne Light Co., Pittsburgh, Pa.

***Accident Prevention Committee**—C. R. Beardsley, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

***Electrical Apparatus Committee**—J. A. Johnson, The Niagara Falls Power Co., Niagara Falls, N. Y.

Engineering Administration Committee—H. P. Liversidge, The Philadelphia Electric Co., Philadelphia, Pa.

***Hydraulic Power Committee**—Byron E. White, Utica Gas & Electric Co., Utica, N. Y.

***Inductive Coordination Committee**—H. L. Wills, Georgia Power Co., Atlanta, Ga.

***Meter Committee**—E. E. Hill, The New York Edison Co., New York, N. Y.

***Overhead Systems Committee**—Harold Cole, The Detroit Edison Co., Detroit, Mich.

***Power System Engineering Committee**—L. W. W. Morrow, *Electrical World,* New York, N. Y.

***Prime Movers Committee**—E. B. Ricketts, The New York Edison Co., New York, N. Y.

Special Engineering Research Committee—C. F. Hirshfeld, The Detroit Edison Co, Detroit, Mich.

***Underground Systems Committee**—J. W. Sylvester, The Philadelphia Electric Co., Philadelphia, Pa.

Public Relations National Section

***Section's Executive Committee**—J. F. Owens, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

***Cooperation with Educational Institutions**—Carl D. Jackson, 36 West 44th Street, New York, N. Y.

***Customer Ownership**—W. H. Hodge, Byllesby Engineering & Management Corp., Chicago, Ill.

***Industrial Relations Committee**—Homer E. Niesz, Commonwealth Edison Co., Chicago, Ill.

***Information Bureau Organizations Committee**—T. A. Kenney, Allied Power & Light Corp., New York, N. Y.

Manufacturers' Advertising Committee—T. J. McManis, General Electric Co., Schenectady, N. Y.

***Public Speaking Committee**—W. S. Vivian, Middle West Utilities Co., Chicago, Ill.

***Relations with Financial Institutions Committee**—A. W. Robertson, Westinghouse Electric & Manufacturing Co., New York, N. Y.

***Women's Committee**—Miss Sophia Malicki, Middle West Utilities Co., Chicago, Ill.

***Provision is made for a representative from each Geographic Division.**

Conventions and Meetings

Meeting of the Section, Bureaus and Committees of the National Electric Light Association are shown in roman type; those of other associations in italics

1929

June

3 Women's Committee, 9 a. m. and 2.30 p. m., Garden Lounge, Dennis Hotel, Atlantic City, N. J.

3 Accident Prevention Committee, 9.30 a. m., Traymore Hotel, Atlantic City, N. J.

3 National Executive Committee, luncheon-meeting, 1 p. m., Ballroom, Ritz-Carlton Hotel, Atlantic City, N. J.

3 Rural Electric Service Committee, 2.30 p. m., Traymore Hotel, Atlantic City, N. J.

3 Rate Research Committee, Traymore Hotel, Atlantic City, N. J.

3 Accounting National Section, Executive Committee, 3 p. m., Westminster Hall, Chelsea Hotel, Atlantic City, N. J.

3 Commercial National Section, Executive Committee, 3 p. m., Room No. 2, Ritz-Carlton Hotel, Atlantic City, N. J.

3 Engineering National Section, Executive Committee, 3 p. m., Room No. 1, Ritz-Carlton Hotel, Atlantic City, N. J.

3 Public Relations National Section, Executive Committee, 3 p. m., Ballroom, Ritz-Carlton Hotel, Atlantic City, N. J.

3–7 Annual Convention and Exhibition, NATIONAL ELECTRIC LIGHT ASSOCIATION, Municipal Auditorium, Atlantic City, N. J.

4 Electrification of Steam Railroads Committee Luncheon-Meeting, 1 p. m., Hotel Shelburne.

4 Geographic Division Secretaries Luncheon-Meeting, 1 p. m., Hotel Traymore.

4 Statistics Committee Luncheon-Meeting, 1 p. m., Hotel Chelsea.

4 National Food Preservation Council Regional Directors Luncheon-Meeting, 1.30 p. m., Rose Room, Hotel Traymore.

4 *Board of Directors, Society for Electrical Development, Traymore Hotel, Atlantic City, N. J.*

5 Class "D" Members (Manufacturers), 12.30 p. m., Municipal Auditorium, Atlantic City, N. J.

5 State Public Utility Information Directors, 1 p. m., Club Room, Hotel Traymore, Atlantic City, N. J.

6 Public Policy Committee, luncheon-meeting, 1 p. m., Ballroom, Ritz-Carlton Hotel, Atlantic City, N. J.

10–15 *Westinghouse Agent-Jobber's Association, The Homestead, Hot Springs, Va.*

14 *Board of Directors, Society for Electrical Development, New York, N. Y.*

16–18 North Central Geographic Division, Breezy Point Summer Resort, Pequot, Minn.

18–21 *Society of Automotive Engineers, New York, N. Y.*

19–21 Canadian Geographic Division, Algonquin Hotel, St. Andrews-by-the-Sea, N. B.

19–22 Pacific Coast Geographic Division, Del Monte, Cal.

20–21 Accounting Section, Wisconsin Utilities Association, Sheboygan, Wis.

24–28 *American Society for Testing Material, Atlantic City, N. J.*

24–28 *American Institute of Electrical Engineers, Swampscott, Mass.*

26–29 Northwest Geographic Division, Seattle, Wash.

July

1–4 *American Society of Mechanical Engineers, Salt Lake City, Utah*

1–5 *American Home Economics Association Convention and Exhibition, Statler Hotel, Boston, Mass.*

18–19 Electric Section, Wisconsin Utilities Association, Hotel Wausau, Wausau, Wis.

August

27–30 *National Association of Railroad and Utilities Commissioners, Glacier National Park Hotel, Glacier National Park, Mont.*

September

2–4 Rocky Mountain Geographic Division Hotel Colorado, Glenwood Springs, Colo.

4–6 Pennsylvania Electric Association, Bedford Springs Hotel, Bedford Springs, Pa.

9–12 New England Geographic Division, Hotel Griswold, New London, Conn.

9–13 *American Society for Steel Treating, Cleveland, Ohio.*

9–14—*Association of Edison Illuminating Companies, Quebec, Canada.*

19–20 Empire State Gas and Electric Association, Saranac Inn, Saranac Lake, N. Y.

28–30 *American Electric Railway Association Convention and Exhibit, Municipal Auditorium, Atlantic City, N. J.*

30 *National Safety Council, Stevens Hotel, Chicago, Ill.*

October

1–4 *American Electric Railway Association Convention and Exhibit, Atlantic City Auditorium, Atlantic City, N. J.*

1–4 *National Safety Council, Stevens Hotel, Chicago, Ill.*

7–10 *Third National Fuels Meeting, American Society of Mechanical Engineers, Bellevue-Stratford Hotel, Philadelphia, Pa.*

14–18 *American Gas Association, Atlantic City, N. J.*

New Members

Electric Light and Power Companies (Class A)

Missouri, St. Louis, Commonwealth Utilities Corporation
New York; New York, North American Gas & Electric Company

Employees of Electric Light and Power Companies (Class B)

California, San Diego, San Diego Consolidated Gas & Electric Co.
  William H. Bamber (Encante, Cal.)
  G. A. Ferguson
  F. T. Hutcheson
  Carl E. Messinger
  Raymond A. Watts
California, Riverside, Southern Sierras Power Company
  I. C. Bishop (Inyokern, Cal.)
  Miss Grace E. Brown
  Ernest U. Bulpitt (Bishop, Cal.)
  Vernon R. Burkett
  Jas. H. Cameron (Bishop, Cal.)
  Gilbert Caro-D'alvaille
  John F. Cochran
  Wade S. Cook (Coachella, Cal.)
  W. J. Elstin (Coachella, Cal.)
  Paul L. Emerson
  Herbert L. Gauldin (Barstow, Cal.)
  G. E. Glazier
  Fred J. Goellner (Yuma, Arizona)
  P. F. Helton (Banning, Cal.)
  A. A. Higginbotham (Goldfield, Nevada)
  W. B. Irvin (Trona, Cal.)
  C. H. Johnston (El Centro, Cal.)
  J. C. Kerr
  Fred H. Krastel (San Bernardino, Cal.)
  Charles T. Lowndes (San Bernardino, Cal.)
  H. T. McKenzie (San Bernardino, Cal.)
  F. E. Niemeyer (San Bernardino, Cal.)
  H. R. Pixley (San Bernardino, Cal.)
  Malcolm A. Ross
  John F. Russell (Hemet, Cal.)
  Harvey W. Smith (Pomona, Cal.)
  R. L. Taylor (Bishop, Cal.)
  Ray L. Thomas (Coachella, Cal.)
  Ernest Vigus (San Bernardino, Cal.)
  Walker S. Waring (Redlands, Cal.)
  Bryant Weeks (San Bernardino, Cal.)
  Stanley Welk
  Clarison Wilbur (San Bernardino, Cal.)
Connecticut, Thompsonville, The Northern Connecticut Power Co.
  George R. Wilson
Connecticut, Waterbury, The Connecticut Light & Power Co.
  A. J. Drummond
  Miss Beatrice A. M. Fiske (Waterville, Conn.)
  E. Harold Keeler (Seymour, Conn.)
Georgia, Atlanta, Georgia Power Company
  Miss Ruby Bowden
  Miss Charlotte M. Keith
  Miss Evelyn Withers
Idaho, Boise, Idaho Power Company
  J. B. McLain
  J. F. Murphy
  Howard E. Waterman
Illinois, Chicago, Commonwealth Edison Company
  M. H. Fritzsche
  Charles B. Johnson
Illinois, Chicago, Illinois Power and Light Corporation
  A. P. Champlin (Galesburg, Ill.)
Illinois, Chicago, Public Service Company of Northern Illinois
  George G. Bailey
  Walter E. Brieschke (Cicero, Ill.)
  Harry M. Brown
  Walter J. Collins (Waukegan, Ill.)
  Charles Dunn, Jr. (Evanston, Ill.)
  C. E. Eichhorn (Maywood, Ill.)
  Orville E. Fry
  F. A. Kobler
Illinois, Dixon, Illinois Northern Utilities Company
  Arthur Nelson
Indiana, Hammond, Northern Indiana Public Service Company
  J. T. Brusky (Chicago, Ill.)
  Harry M. Keller
Indiana, Indianapolis, Indianapolis Power & Light Co.
  Thomas W. Ayton
Indiana, Marion, Indiana General Service Company
  Paul B. Dougherty
Iowa, Dubuque, Interstate Power Company
  H. A. Moline (Bemidji, Minn.)
  Charles F. Sonnenberg (Crookston, Minn.)
Kentucky, Louisville, Kentucky Utilities Company
  Miss Louise Riedel (Lebanon, Ky.)

- *Kentucky, Louisville,* Louisville Gas and Electric Company
  - F. J. Pfeiffer
- *Louisiana, Algiers,* Louisiana Power & Light Company
  - S. L. Davis (New Orleans, La.)
- *Massachusetts, Amherst,* Amherst Gas Company
  - Howard J. Cadwell
- *Massachusetts, Boston,* The Edison Electric Ill'g Co. of Boston
  - Walter E. Carley
  - Nelson A. Shaw, Jr.
- *Massachusetts, Boston,* New England Power Company
  - Jesse E. Gray
- *Massachusetts, Lowell,* The Lowell Electric Light Corp.
  - Kenneth Sellers Field
- *Massachusetts, Lynn,* Lynn Gas & Electric Company
  - Paul J. Kolodziej
  - William L. Mather
- *Massachusetts, Malden,* Malden Electric Company
  - T. D. Schoonmaker
- *Michigan, Detroit,* The Detroit Edison Company
  - M. P. Bailey
  - Lester O. Palmiter
- *Michigan, Jackson,* Consumers Power Company
  - R. A. Garrett
  - George E. Korten
  - A. E. Kriegsman
  - C. C. Steck
- *Minnesota, Duluth,* Minnesota Power & Light Co.
  - Roy O. Bumann (Cloquet, Minn.)
  - William Luthjohn (Eveleth, Minn.)
  - T. J. McMillin (Sandstone, Minn.)
  - B. McTeigue (Duluth, Minn.)
  - Ed P. Oberg (Park Rapids, Minn.)
- *Minnesota, Minneapolis,* Northern States Power Company
  - J. E. Stoddard
- *New Hampshire, Manchester,* Public Service Company of New Hampshire
  - Mrs. Hattie Bohonan
- *New Jersey, Atlantic City,* Atlantic City Electric Company
  - I. Walton Bolger (Milford, N. H.)
  - Philadore F. Daigle
  - E. C. McDonel (Absecon, N. J.)
  - Walter J. Siner
  - Walter B. Soulas
  - Sylvern E. Stratton (Ventnor, N. J.)
- *New Jersey, Newark,* Public Service Electric & Gas Co.
  - Horace R. Albright (Marlton, N. J.)
  - John Allhusen (New Paltz, N. Y.)
  - William Rowland Bayley (E. Orange, N. J.)
  - Charles H. Behrens (Jersey City, N. J.)
  - Laurence C. Bellamy (Irvington, N. J.)
  - Harold S. Berry (Moyland, Pa.)
  - James Chamberlain (Riverside, N. J.)
  - Stanley Leonard Chapin (Trenton, N. J.)
  - Edgar G. Colkitt (Vincentown, N. J.)
  - Robert Doehne (Jersey City, N. J.)
  - Edward A. Driscoll (Hackensack, N. J.)
  - Eugene Michael Fahey
  - J. L. Fuller (Burlington, N. J.)
  - Milton E. Gardner (Camden, N. J.)
  - Kenneth Frank Gray
  - Guy M. Griffiths, Jr. (Montclair, N. J.)
  - Jan Groenendyk (Hawthorne, N. J.)
  - John Henningsen (Bayonne, N. J.)
  - Wm. E. Jocher (Jersey City, N. J.)
  - William Devoll Kilby (Irvington, N. J.)
  - Clarence W. Lambert (Montclair, N. J.)
  - Rowland Lawrence (Jersey City, N. J.)
  - Clarence Lewis (Metuchen, N. J.)
  - Fred J. Ludwig
  - John J. McDevitt, Jr. (Hackensack, N. J.)
  - John B. McKeon (Irvington, N. J.)
  - Philip W. Maher (Hackensack, N. J.)
  - Albert M. Nebbia (Hackensack, N. J.)
  - Oscar A. Newton (Irvington, N. J.)
  - V. N. Prehn
  - Walter F. Radley (Hasbrouck Heights, N. J.)
  - Frederick George Ruhl (Trenton, N. J.)
  - Charles A. Scherer (West Orange, N. J.)
  - Walter Ware Slocum
  - Granville Strean (Trenton, N. J.)
  - Homer Steiner (Trenton, N. J.)
  - E. W. Van Buskirk (Irvington, N. J.)
  - John H. Wieting (Hackensack, N. J.)
  - Donald K. Wright (Montclair, N. J.)
- *New York, Albany,* New York Power & Light Corp.
  - John T. Brady
- *New York, Buffalo,* Buffalo General Electric Company
  - A. P. Niebling
- *New York, Lockport,* Lockport Light, Heat & Power Company
  - T. W. Connette
- *New York, Mount Vernon,* Westchester Lighting Company
  - Charles A. Chretien (Yonkers, N. Y.)
  - Mrs. Elizabeth K. Todd (New Rochelle, N. Y.)
  - Miss Betty Viney (Mount Vernon, N. Y.)
  - Mrs. Anna Whalen (Yonkers, N. Y.)
  - Miss Ellen Widulski
- *New York, Brooklyn,* Brooklyn Edison Company
  - Edward J. O'Toole
- *New York, New York,* Allied Power & Light Corporation
  - Charles Ivan Crippen
  - Jonathan Hall Truman, Jr.
- *New York. New York,* Electric Bond & Share Company
  - Boris Baievsky
  - John Dudley Carroll
  - E. F. Johnson (Buenos Aires, Argentina, S. A.)
- *New York, New York,* The New York Edison Company
  - Thomas A. Dowd, Jr. (Brooklyn, N. Y.)
- *New York, New York,* New York State Committee on Public Utility Info.
  - A. Von Schrader
- *New York, New York,* North American Gas & Electric Company
  - Leo Loeb
  - Theodore Malm
  - F. D. Reid
  - Phillips B. Shaw
- *New York, New York,* United Electric Light & Power Company
  - Adolph Leichtman
- *New York, Long Island City,* New York & Queens Electric Light & Power Co.
  - James P. Garrison (Astoria, N. Y.)
  - Miss Lillian I. Gisburne (Elmhurst, N. Y.)
  - Alexander Fred Newman (Flushing, L. I., N. Y.)
  - Matthew H. Stokes
- *New York, Staten Island,* Staten Island Edison Corporation
  - Louis A. Despart (West New Brighton, S. I., N. Y.)
- *New York, Poughkeepsie,* Central Hudson Gas & Electric Corp.
  - R. I. Fletcher
- *North Carolina, Raleigh,* Carolina Power & Light Company
  - R. S. Broderick (Asheville, N. C.)
  - W. R. Doar (Asheville, N. C.)
  - C. T. Isley (Asheville, N. C.)
- *Ohio, Cincinnati,* Columbia Engineering & Management Corp.
  - Harry R. Burns
  - John G. Butterworth
  - O. S. Clark
  - Henry W. Keller
  - A. C. Moorhaus
- *Ohio, Toledo,* The Toledo Edison Company
  - Walter M. Campbell
- *Oregon, Portland,* Northwestern Electric Company
  - Asa K. Gaylord (Multnomah, Oregon)
- *Oregon, Portland,* Pacific Power & Light Company
  - Geo. F. MacKenzie
  - H. C. McDaniel (Walla Walla, Wash.)
- *Oregon, Portland,* Portland Electric Power Company
  - H. A. Joslin
  - Jas. L. Watson (Vancouver, Wash.)
  - C. F. Young
- *Pennsylvania, Harrisburg,* Pennsylvania Electric Association
  - A. B. Millar
- *Pennsylvania, Norristown,* Philadelphia Suburban Counties Gas & Elec. Co.
  - James M. Baird
  - George C. Guthrie, Jr.
  - Ellwood M. Rowland, Jr. (Philadelphia, Pa.)
- *Pennsylvania, Philadelphia,* The Philadelphia Electric Company
  - Frank W. Campbell
  - John W. Engle
  - R. R. Johnson
  - P. A. Wilson
  - Ralph V. H. Wood
- *Pennsylvania, Pittsburgh,* Duquesne Light Company
  - R. B. Horner
  - L. J. Lamberger
  - Dwight L. McNulty
  - R. W. Marity
- *Pennsylvania, N. S. Pittsburgh,* West Penn Power Company
  - Clair F. Ollinger
- *South Dakota, Huron,* Northwestern Public Service Co.
  - C. W. Davis (Mitchell, S. D.)
  - W. R. Gazin
  - Carl Grothe
  - C. J. Guhin (Aberdeen, S. D.)
  - G. J. Kendall (Webster, S. D.)
  - G. C. McCarney (Redfield, S. D.)
  - B. L. Palm
  - F. E. Scott
  - E. Vere Stalcup
  - C. N. White
- *South Dakota, Watertown,* Watertown Public Service Company
  - E. P. Harrison
- *Tennessee, Chattanooga,* Southern Cities Power Company
  - F. M. Laird (Philadelphia, Pa.)
- *Texas, Abilene,* West Texas Utilities Company
  - Frederick A. De Lay
- *Texas, Amarillo,* Southwestern Public Service Co.
  - J. S. Wilson
- *Texas, Beaumont,* Gulf States Utilities Company
  - H. E. Braunig
  - W. E. Brown
  - Geo. B. Morgan (Port Arthur, Texas)
- *Texas, Dallas,* Texas Power & Light Company
  - R. L. Beale (Big Spring, Texas)
  - L. C. Eubank (Hillsboro, Texas)
  - H. O. Green (McKinney, Texas)
  - O. S. Hockaday
  - E. E. McAdams (Taylor, Texas)
  - W. D. Maddrey (Wichita Falls, Texas)
  - W. A. Niebuhr (Tyler, Texas)
- *Texas, Dallas,* Texas Public Service Information Bureau
  - William C. Grant
- *Texas, Fort Worth,* Texas-Louisiana Power Company
  - F. E. Bray (Lexington, Ky.)
  - Mrs. Clare Belle Clark (Lexington, Ky.)
  - Geo. Johnson (Detroit, Texas)
  - A. F. Kreissig (Lexington, Ky.)
  - G. A. Tracht (Lexington, Ky.)
- *Utah, Salt Lake City,* Utah Power & Light Company
  - F. B. Williams
- *Vermont, Brattleboro,* Twin State Gas & Electric Company
  - P. J. Hopkins
- *Washington, Seattle,* Puget Sound Power & Light Company
  - E. P. Donegan (Everett, Wash.)
  - John MacEwell
  - H. A. Gardner
  - W. A. Schoel (Puyallup, Wash.)
  - J. C. Scott
- *Washington, Spokane,* The Washington Water Power Company
  - Charles B. Carpenter
  - J. G. Finley
  - T. W. MacLean
  - Ladner V. Ross
  - Arthur H. Wegner
- *West Virginia, Charleston,* Appalachian Electric Power Company
  - T. M. Hays (Huntington, W. Va.)
- *West Virginia, Fairmont,* Monongahela West Penn Public Service Co.
  - G. M. Alexander
  - C. H. Hardesty
  - E. S. Winfree
- *Wisconsin, Green Bay,* Wisconsin Public Service Corporation
  - E. B. Holub
- *Wisconsin, Milwaukee,* The Milwaukee Electric Railway & Light Co.
  - A. Brettmann
  - J. G. Dickinson
- *Canada, N. S., Halifax,* Nova Scotia Light & Power Co., Ltd.
  - W. H. Colvert, K. C.
  - J. F. Lumsden, Esq.
- *Canada, Ontario, Ottawa,* The Ottawa Electric Company
  - C. B. Bradshaw, Esq.
- *Canada, Quebec, Arvida,* Saguenay Electric Company
  - J. L. Blondeau, Esq. (Chicoutimi, Can.)
- *Canada, Quebec, Montreal,* Shawinigan Water & Power Company
  - R. G. Swan, Esq.

Manufacturers (Class D)

- *Illinois, Bloomington,* Williams Oil-O-Matic Heating Corp.
- *Illinois, Chicago,* Chicago Concrete Post Company
- *Illinois, Chicago,* Paul E. Johnson, Incorporated
- *Illinois, Chicago,* Taylor Forge & Pipe Works
- *Massachusetts, Boston,* Stets Company
- *New Jersey, Trenton,* John A. Roebling's Sons Company
- *New York, New York,* Coal Conversion Corporation
- *New York, New York,* Dexter Rubber Corporation
- *New York, New York,* Electrical Research Products, Incorporated
- *New York, New York,* International Business Machines Corporation
- *New York, New York,* Kellems Products, Inc.
- *New York, New York,* Silvray Company, Inc.
- *New York, Syracuse,* Syracuse Washing Machine Corp.
- *Ohio, Alliance,* The Buckeye Twist Drill Co.
- *Ohio, Canton,* The Wilson Rubber Co.
- *Ohio, Dayton,* Dayton Pump & Manufacturing Co.
- *Ohio, Dayton,* Delco-Light Company
- *Ohio, Findlay,* Porcelain Products, Inc.

Pennsylvania, Reading, Reading Sheet Metal Products Co.
South Carolina, Spartanburg, Taylor-Colquitt Company

Employees of Manufacturing Companies (Class E)

California, Los Angeles, Kelman Electric & Mfg. Company
L. C. Salisbury (Hollywood, Cal.)
Connecticut, Branford, Malleable Iron Fittings Company
Walter Cunliffe
Connecticut, New Haven, National Electric Condenser Co.
W. J. Herrick (Philadelphia, Pa.)
F. N. Hewson (Philadelphia, Pa.)
Connecticut, New Haven, Rockbestos Products Corporation
F. W. Allen (Chicago, Ill.)
Connecticut, Plainville, The Trumbull Electric Mfg. Co.
A. H. Bergendahl (New York, N. Y.)
Illinois, Chicago, American Ironing Machine Company
C. F. Barkow
W. J. Dickinson (Minneapolis, Minn.)
E. C. Peter (Algonquin, Ill.)
Illinois, Chicago, The Conover Company
C. L. Holden (Boston, Mass.)
A. A. Macool (Philadelphia, Pa.)
Mrs. Emma H. Macool (Philadelphia, Pa.)
F. H. Peters
Illinois, Chicago, Delta-Star Electric Company
W. O. Hampton
A. E. Nessler
Illinois, Chicago, Edison Electric Appliance Co., Inc.
Miss Valene Barden
Illinois, Chicago, G. & W. Electric Specialty Company
Pearson F. Williams
Illinois, Chicago, Schweitzer & Conrad, Inc.
J. M. Livingston
H. I. Ward
Illinois, Springfield, Sangamo Electric Company
Robert C. Lanphier, Jr.
Indiana, Indianapolis, Transelectric Company
W. H. Bloss
Indiana, South Bend, South Bend Current Controller Company
E. L. Thompson
Iowa, Newton, One Minute Manufacturing Co.
C. K. Bergman (Syracuse, N. Y.)
R. W. Bergman
Massachusetts, Ashland, Warren Telechron Company
R. M. Chase
James A. Robertson
Massachusetts, Worcester, American Steel & Wire Co., Russ Bldg.
Howard N. Pratt (San Francisco, Cal.)
Michigan, Grand Rapids, Leonard Division of Kelvinator Corp.
Paul H. Puffer
Minnesota, Minneapolis, Electric Machinery Mfg. Co.
C. G. Lindquist (New York, N. Y.)
C. R. Zimmerschied (New York, N. Y.)
Minnesota, Saint Paul, Bohn Refrigerator Company
R. G. McCord
L. L. Murray
Nebraska, Omaha, Clark Electric Water Heater, Div. of McGraw Electric Company
A. J. Cole
L. C. Felker
A. E. Julian
New Jersey, Newark, Hanovia Chemical & Mfg. Company
Arthur Arnold
C. H. Bailey
E. C. Ward
New Jersey, Trenton, Circle F Mfg. Company
J. W. Henney
W. M. Shafer
New Jersey, Trenton, John A. Roebling's Sons Co.
Alfred P. S. Bellis
Hobart G. Suppers
New York, Jamestown, Blackstone Mfg. Company
E. J. O'Reilly (Minneapolis, Minn.)
New York, Le Roy, Lapp Insulator Co., Inc.
H. Douglas Stier (Atlanta, Ga.)
New York, New York, Alberene Stone Company
Daniel F. Noll (Chicago, Ill.)
New York, New York, Bullard-Davis, Inc.
Herbert Brendlen
L. J. Perrin
New York, New York, Burndy Engineering Co., Inc.
A. B. Dibner
Marvin Lee
Harry Pearson
New York, New York, Coal Conversion Corporation
F. E. Brocker
New York, New York, Combustion Engineering Corporation
W. C. Drake
F. L. Farrell (Boston, Mass.)
H. D. Savage
C. W. Sengstaken
H. A. Telander (Pittsburgh, Pa.)
Carl F. Weigel (Chattanooga, Tenn.)
New York, New York, Foster Wheeler Corporation
Henry W. Wetjen (Roselle Park, N. J.)
New York, New York, General Office Equipment Corporation
D. Wodlinger (Chicago, Ill.)
New York, New York, General Outdoor Advertising Company
Louis St. John (Atlantic City, N. J.)
New York, New York, Serelco, Inc.
Thomas F. Chantler
Willard Hall
Carleton E. Hutchings
New York, New York, P. Wall Mfg. Supply Co.
E. H. Brinkman
R. J. Criste (N. S. Pittsburgh, Pa.)
New York, New York, Waterbury Cable Service, Inc.
H. E. Martin
New York, Rochester, Robeson Rochester Corporation
J. A. Sullivan
New York, Syracuse, Syracuse Washing Machine Corp.
A. M. Evans
M. Gilde
Ohio, Alliance, The Buckeye Twist Drill Company
R. P. Dunmire
Ohio, Canton, Union Metal Mfg. Co.
E. H. Crider (Cleveland, Ohio)
E. M. Peake (Los Angeles, Cal.)
W. C. Record (Seattle, Wash.)
Ohio, Canton, Wilson Rubber Company
Frank E. Barns (Chicago, Ill.)
F. J. Wilson
Ohio, Cleveland, The Kayline Company
E. F. Bachman (Lakewood, Ohio)
A. I. Klein
Samuel A. Klein (Asheville, N. C.)
Ohio, Cleveland, The Liberty Gauge & Instrument Co.
Jos. Tiers, Jr.
Ohio, Cleveland, National Carbon Co., Inc.
J. A. Hammond
Ohio, Cleveland, National Lamp Works of G. E. Co.
T. J. Rider, Jr. (Chicago, Ill.)
T. Douglas Scarff (Chicago, Ill.)
Ohio, Cleveland, Wellington J. Smith Company
Guy L. Derr
Wellington J. Smith
Ohio, Dayton, Dayton Pump & Manufacturing Co.
Karl M. Brower
C. C. Heller
K. E. Phares
Thos. M. Yoder
Ohio, Dayton, Delco-Light Company
H. I. Andrews
J. E. Waggoner
Ohio, Dayton, Frigidaire Corporation
James A. Borland (Chicago, Ill.)
Frank Cotton (Kenmore, N. Y.)
J. T. Coventry (Cleveland, Ohio)
A. A. Jones (Kansas City, Mo.)
Harold G. Stern
Ohio, Dover, The Dover Manufacturing Company
Herbert Mould (New York, N. Y.)
Ohio, Findlay, Porcelain Products, Inc.
Rolland E. Dalton
Ohio, Hamilton, Estate Stove Company
Geo. C. Osborn (San Francisco, Cal.)
Ohio, North Canton, The Hoover Company
E. M. DeRamus (Atlanta, Ga.)
Pennsylvania, East Pittsburgh, Westinghouse Electric & Mfg. Co.
Geo. M. Boyd (Seattle, Wash.)
Richard Stein (Wilkinsburg, Pa.)
Pennsylvania, Glassport, Copperweld Steel Company
Jerome B. Clapp (New York, N. Y.)
Clyde C. Sowards
P. A. Terrell (Birmingham, Ala.)
Pennsylvania, Philadelphia, American Engineering Company
J. S. Bennett
P. N. Oberholtzer
Pennsylvania, Philadelphia, The Electric Storage Battery Company
Albert N. Dingee
Pennsylvania, Philadelphia, I-T-E Circuit Breaker Company
G. R. Horne (Detroit, Mich.)
Pennsylvania, Pittsburgh, Aluminum Company of America
A. V. Karpov
H. H. Martindale.
Pennsylvania, Pittsburgh, Mine Safety Appliances Company
L. J. Bowker (Philadelphia, Pa.)
J. M. Lewis
E. M. McCool (Bloomfield, N. J.)
C. L. Turner (New York, N. Y.)
Pennsylvania, Pittsburgh, Oliver Iron and Steel Corporation
E. C. Eaglen
B. D. Quarrie
Pennsylvania, Pittsburgh, Standard Sanitary Mfg. Co.
C. W. Rosselot
J. J. Snyder
Jos. A. Winkler
Pennsylvania, Pittsburgh, Standard Underground Cable Company
R. I. Wilson (Philadelphia, Pa.)
Pennsylvania, Pottstown, Automatic Electric Heater Company
Charles I. Smith (Birmingham, Ala.)
Wisconsin, Beaver Dam, Malleable Iron Range Company
C. Dingel
Wisconsin, Milwaukee, Allen Bradley Company
W. B. Neeper
Wisconsin, Two Rivers, Metal Ware Corporation
P. C. Cloyd (Chicago, Ill.)

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Delaware, Wilmington, Willis A. Naudain, Electrical Engineer
D. C., Washington, Public Utilities Reports, Inc.
Florida, Tampa, Pierce Electric Co.
Georgia, Atlanta, Hopkins Equipment Company
Illinois, Chicago, Illinois Electric Co. of Illinois
Indiana, Indianapolis, Varney Electrical Supply Co.
Maryland, Baltimore, Commercial Credit Company
Michigan, Detroit, Commercial Electric Supply Co.
Minnesota, Minneapolis, P. E. Loye, Consulting Engineer
Minnesota, White Bear Lake, B. O. Horton
Missouri, St. Louis, Commercial Electrical Supply Co.
New Jersey, Atlantic City, John W. Armitage
New Jersey, Newark, Newark Electrical Supply Co.
New York, New York, Alpha Electric Co., Inc.
New York, New York, Robert Cameron Beadle, Inc.
New York, New York, Franz Joerger, Sales Agent, Maschinenfabrik Augsburg-Nuernberg A-G
New York, New York, William Porter
New York, New York, Pubutility Publishing Co., Inc.
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Ohio, Cleveland, Erner Electric Co.
Oregon, Portland, Fobes Supply Company
Pennsylvania, Philadelphia, H. C. Roberts Elec. Supply Co.
Pennsylvania, Pittsburgh, B. Floersheim & Company, Inc.
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Washington, Seattle, Fobes Supply Company
Washington, Spokane, Fobes Supply Company
Wisconsin, Milwaukee, Julius Andrae & Sons Co.

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West W. Jordan (Cynwyd, Pa.)
Indiana, Indianapolis, The Varney Electrical Supply Co.
R. L. Brown
O. L. Ferguson
J. H. Richards (Evansville, Ind.)
Maryland, Baltimore, Commercial Credit Company
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R. W. Burman
Milton O. Ningard
Michigan, Detroit, Commercial Electrical Supply Co.
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F. Neuman
F. D. Phillips
J. B. Trescott
Missouri, Kansas City, The Chas. L. Ward Co.
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New York, New York, Cinderella Appliances Corporation
C. Milton Donohue
Miss Christie M. Hartman
New York, New York, R. W. Cramer & Company, Inc.
Frank R. Brophy
William Paul

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    - H. L. Harter (Philadelphia, Pa.)
    - H. J. McNamee
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    - John F. Murray
- *New York, New York,* Sparklets, Inc.
    - A. Edwin Fein
- *New York, New York,* Stevens & Wood, Inc.
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    - R. H. Anderson (Blue Ridge, Ga.)
    - C. E. Bauman (Jackson, Mich.)
    - F. Matthew Baxandall (Jackson, Mich.)
    - Gasimer S. Bierwagen (Jackson, Mich.)
    - H. D. Bronson (Jackson, Mich.)
    - Max Chandler (Jackson, Mich.)
    - George C. Daniels (Jackson, Mich.)
    - T. C. Dee (Jackson, Mich.)
    - E. F. Dissmeyer (Jackson, Mich.)
    - Walter J. Ducey (Jackson, Mich.)
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    - J. T. Ridgeway (Baltimore, Md.)
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    - John D. Beltzhoover
- *Ohio, Cleveland,* The Erner Electric Company
    - W. W. Adams
    - E. C. Brode
    - Ernest Kuhn
- *Pennsylvania, Philadelphia.* United Engineers & Constructors
    - F. P. Fairchild
- *Texas, Dallas,* Electric Appliance Company, Inc.
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    - E. I. Jones (Oklahoma City, Okla.)
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- *Colombia, Barranquilla,* Compania Colombiana de Electricidad
- *Costa Rica, San Jose,* Compania Nacional de Electricidad

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    - W. L. Simpson
- *Cuba, Havana,* Cia Cubana de Electricidad
    - Lyman Chatfield
    - Fred E. Krieghoff
    - C. B. Oliver
    - C. W. Ricker
    - T. M. Victory
    - C. A. Whipple

New Developments

(*Continued from page* 394)

tains accounts of many pieces of apparatus developed by utility companies which should be of interest and benefit to others.

The committee points out that no attempt is made to verify the claims made for the devices described in this report. Although the devices described are not given an official approval of the Meter Committee, material contained in this report is worthy of consideration and investigation.—*E. S. B.*

International Association Proceedings

THE Union Internationale des Producteurs et Distributeurs d'Energie Electrique announces the publication of the proceedings of the congress of that organization held in Paris, July 5-16, 1928.

The Union Internationale is an organization quite similar to our own National Electric Light Association but international in character. Its membership includes representation from all Continental European countries and Great Britain, as well as from Asiatic countries and the Americas. The subjects covered in their proceedings are similar to our own and provide a valuable record of European views upon the subjects that engage the attention of our own organization.

The proceedings of the 1928 congress consist of a volume of 960 pages and may be had for 150 francs plus cost of carriage. Orders should be addressed to the Union Internationale des Producteurs et Distributeurs d'Energie Electrique at 26 Rue de la Baume, Paris, and remittance made preferably by international money order.—*A. M.*

CORRESPONDENCE

To the Editor:

In the April issue of N. E. L. A. BULLETIN I notice an interesting new department under the title "The Reviewing Stand." For your information, this phrase was registered in the United States Patent Office in 1926 as a trade mark of International Paper Company, and since then it has headed a page every month in *International Paper Monthly,* the magazine which we print for our employees.

You may wish to mention this fact in the BULLETIN or you may not want to. You are at perfect liberty to continue using the phrase without saying anything, but I am mentioning the above as I naturally feel rather flattered that you have also commenced using this phrase.

As you probably know, the New York *Sun* has a column of that name in its weekly book review section. The *Sun* commenced using the name shortly after I had it registered.

F. T. HARRIS.

International Paper Company,
New York, N. Y.

The Editor was unaware that the caption, "The Reviewing Stand," was copyrighted. The kind permission of Mr. Harris and the International Paper Company for its continued use in the BULLETIN is appreciated.

Considering Certain Obligations

(*Continued from page* 360)

public schools. There is nothing new, unique or startling about such an inquiry. In fact, it would be well if the idea could be extended and every great industry *persuaded,* if you please, to make exactly the same sort of inquiry and call the attention of both authors and publishers to any glaring inaccuracies. That is, unless we adhere to the idea that it makes no difference what our children are taught as long as the teaching is done by professional educators and as long as the text books used have been approved by these same educators. To this I cannot subscribe.

The fact remains that somehow, somewhere, there is a very distinct strain of obligation resting on the light and power industry, just as it rests on every other great industry, to do everything in its power to assist that great institution, American Education. I believe this obligation is recognized by a majority of the educational institutions, for certainly they seem to have no hesitancy in asking for cooperation and help and no hesitancy in expressing their appreciation for this addition to the service the industry is already giving the public. There are those who do not agree; but a certain number of fleas are good for any dog.

Engineering Section Report

(*Continued from page* 350)

who in turn are the engineers actually responsible in their own companies for the work covered by the reports. It is earnestly recommended that all member companies place standing orders with Headquarters for new reports of the various committees as they are issued, in order that their engineers may keep fully informed on the engineering developments in the industry.

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THE PRESIDENT'S PAGE

Orderly Development and Progress

OUR Association this month enters a new year in its affairs under a new administration. Its policy is so wisely adjusted, however, that a new administration is merely a slightly changed group of officers. Continuity of policies and personnel thus is preserved, and orderly development and progress in Association business becomes assured. In this we accurately reflect conditions in the great industry the Association represents.

Whatever surface changes take place, underlying them, giving form to them, there is orderly development of the industry. There is progress in its job of supplying an essential service to the public, and such development and progress continue and will continue because ours is an industry thoroughly cognizant of its responsibilities and possessed of a determination to live up to them in fullest measure.

Its course shows an unbroken record of reaching more people and more territory with service each year. Standards of service have been raised notably in recent years. There has been a steady decline in the prices charged for service. The average of domestic rates now is far lower than before the World War.

Thus our industry, year by year, becomes of wider usefulness and builds itself more firmly into the economic structure of the country. It proves its spirit by its works.

Production and sales of current increase annually. Thus we have a right to believe that the public we serve recognizes and appreciates a good job, because our service is used only as it proves well worth the price paid for it.

President.

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Lexington	8312	Editorial Department

mkwh

UNLESS there is a serious recession in the activity of the country's business, the year 1930 will see a production of electricity in excess of 100,000.000,000 kilowatthours. Another digit will thus be added to the long line of numbers which measure the nation's power supply. The extraordinary size of the figures which the smallest of our prevailing unit of measure produces wherever any aspect of present-day electric service is mentioned, renders such discussions entirely incomprehensible to the layman and easily and frequently garbled by the usual writer and printer.

In every phase of human endeavor, the unit of measurement is commensurate not only with the size of the object measured but also with the accuracy it is possible to attain. Nobody counts the production of writing paper by individual sheets or that of pig iron by pounds or measure astronomical distance by miles. Similarly, few statistics are accurate within one-tenth of one per cent. In other words, in any line of figures the first two are presumably correct, the third may be too large or too small by one unit, and the remainder of the numbers usually serve merely to give an air of fictitious and undeserved accuracy.

Several weeks ago the *Electrical World* suggested the use of "megawatthour" to signify a million watthour units as a term to supplement kilowatthour. We would like to go the *World* one better and propose a prefix which will express output in billions of units, and thereby eliminate six out of a possible eleven ciphers, instead of three as would be the case with the use of megawatthour. In line with the tradition of Greek terminology, this might perhaps be called "makrokilowatthour," signifying a billion watthour units. Its abbreviation to "mkwh" would facilitate easy absorption by industry and public.

The adoption of this term would, among other things, conserve space, minimize the chances for typographical and other errors and convey to the public a more understandable idea of the magnitude of electric service.

kw-hr. or kwh

FOR a number of years the abbreviation for kilowatthour recognized as official in the United States has been kw-hr. Most publications, both commercial and those of the technical societies and associations, undoubtedly have made an honest effort to conform in its use—but, alas, with not always happy results, as witness the following list:

Kw.-hr.	Journal A I E E
kw.hr.	Electrical World Electrical Merchandising Electrical West Public Service Management
Kw-hr.	N.E.L.A. Proceedings
kw-hr.	Electrical World N. E. L. A. Proceedings Power Plant Engineer Journal A I E E
kw.Hr.	Electrical News (Canada)
kw.-hr.	Electrical Journal
K.W.hrs.	Electrical South
K.W.H.	East Central Division Monthly Financial Digest
KWH	Public Service Management
kwh.	Electric Light and Power

This list was prepared after a casual inspection of the publications quoted. It could probably be doubled by a little earnest research.

In the scrutiny of a number of representative power company rate schedules, and bills to consumer forms, almost as great a diversity in abbreviation was detected, although the majority of companies may be divided into three distinct schools: those that take no chances and spell kilowatthour in full; those that abbreviate with capital K W H without periods, or with periods in assorted positions; and those who use lower case kwh, with or without a final period.

From conversation with a number of the staff, and with visitors to Headquarters, it develops that all who were interviewed, while either knowing, or knowing of the official abbreviation, think and write in the terms of kwh rather than in the longer form.

The abbreviation kw-hr. no doubt originally received its official standing for some logical reason. Perhaps it came into being when kilowatthour was so novel a term that a distinct and unmistakable abbreviation was considered a necessity. Whatever the reason it can hardly hold force today. The present recognized abbreviation is too long. It's complexity invites too many variations even when an effort is made to use it correctly. It has not been accepted by the majority who have need to use it frequently. An officially recognized shortening to kwh would be a boon to writers, editors and readers.

Common Sense

INTERPRETATIONS of the essentials of ordinary "common sense" may differ. Certainly, however, everyone will agree on the desirability of avoiding hazards carrying potentiality of serious accidents. That such hazards may be caused or allowed to exist in the homes, through lack of knowledge, is a fact proved by occasional reports of accidents. In proportion to the nation-wide exposure and possibilities, the frequency of these accidents is very low. The hazard is nevertheless a fact.

If users of electricity can be simply informed in the essentials of proper use and avoidance of the conditions under which a potential hazard is converted into an accident, the growing volume of defective material will be rendered relatively harmless. With this in mind the Accident Prevention Committee of the Association has prepared a pamphlet entitled "Common Sense," reproduced elsewhere in this issue, which contains ten rules with which every user of electricity should become familiar. Observance of these simple rules should practically eliminate the chances for hazard in the domestic use of electricity.

N·E·L·A·
BULLETIN

July, 1929

Vol. XVI No. 7

Super-Humans for Better Institutions

By JOHN F. GILCHRIST

Mr. Gilchrist is a vice-president of the Middle West Utilities Company, and a former president of the National Electric Light Association. This address was delivered at the Fifty-Second Convention of the Association held at Atlantic City, June 3-7, 1929.

TO the strong, intelligent, thinking young people of America; to the self-sacrificing men and women of high purpose and high attainment who constitute the faculties and the officers and trustees responsible for the policies and properties of the great educational institutions of this country, and finally to the directors, officers and personnel of the companies, already great, producing and distributing electricity in this land, this address is respectfully directed.

Upon you rests the responsibility for the proper development of a great fundamental industry, possibly to become the greatest of all industries and the one to which, more than any other, will the people of our country and the world be indebted for the greatest measure of human life and happiness.

The industry whose product gives one man the producing power of scores of men of only a few generations past, that spreads the noonday light over the hours of darkness, that for a trifle provides the poor of today with relief from grinding labor and with comforts and conveniences, life lengtheners, which the money of the rich could not buy in the days of our grandparents.

What Electricity Has Become

I ask you in all modesty to stop a minute and consider what electricity and the electrical industry has already become in our lives, only fifty years since the first practical discoveries were made and we first began to know this wonderful energy, more flexible than the hand of the maiden, more powerful than the arm of the giant, a superb and ideal servant which is already performing so manifold a service in the home, the mart and the factory, and which has already become the life spark of so many great industries, such as those making automobiles, aeroplanes and radios, which would fail and disappear without it, that we can hardly vision the chaos which would prevail if the electric industry were suddenly to be withdrawn. The production and distribution of electricity is an industry engaging directly between three and four hundred thousands of our people, and as an initiator of the use of electricity it may be said to be responsible for the employment in all branches of the industry of over a million; an industry engaging ten billions of the savings of our people, and therefore more democratically owned and managed than any of our great industries, for its seven to ten millions of average citizen-owners far outstrips in numbers that other great group which owns the farms of the country; an industry which serves twenty millions of customers with an amount of energy equivalent to the work of thirty million horses laboring continuously twelve hours per day every day in the year.

One-half of this great development has taken place in the last ten years, forty years of previous growth doubled in ten, the result of a great and numerous people awakening to what electricity will do for them. And who will say that this rate of growth will not continue and even increase.

Need for Superior Personnel

Naturally, this great and rapidly growing industry creates many demands on world resources, any one of which might be the subject of much discussion. I wish to discuss but one, the one which, I believe, is the greatest of all.

Looking to the future, the greatest need of this industry is for men and women—or, might I say, for superior men and women — superior in mental and physical vigor, superior in common sense, superior in general and special education, trained young people with an intimate knowledge of the present-day conditions in the business in which they expect to embark, so that on embarking there shall be the least time lost in finding themselves.

The period of physical vigor in the human being is so short that in occupations where experience added to other qualifications is a matter of so much importance, it is essential that no time should be lost in orienting the trained novitiate so that he may promptly assume the responsibilities of the position for which he has been trained.

The Question of Size

Much thought is being given today to the question of what will be the limitation in size of our great commercial and industrial institutions, how much larger they can become, or to put it another way, as a recent speaker has said, "Are we building up something that will finally overwhelm us physically, mentally, sociologically and politically? Is this machinery of our life getting so complex and overpowering that the human machine is breaking down under it?" What are the limitations of our modern institutions? And if growth is desirable, from the standpoint of humanity's best interests, how can we extend these limitations? Will the human intellect, the human body, the vision, appreciation, determination, self-control of man be such that bigger men and women, better educated, better trained, will develop to take the bigger jobs? Or, to put it another way, must the jobs stop growing in size, regardless of the advantages to the many, because we have reached the absolute limit of human capacity? To a certain extent we are facing this problem in our industry today. The big jobs are being filled, but no one appreciates more than the people that are in them, regardless of their capability, regardless of the fact that they are the best available, how much better fit they might be if they had had the benefit of special training for their present positions, or if they had known when they were young students, or if their instructors had known then as much as the occupants of these jobs now know of the requirements. Of course, that would be impossible and will continue to be, at least until we can see much farther into the future than we can at present, but we now have a much better opportunity to judge of the requirements twenty-five years hence than the present executives had when they began, and much can be done to provide for the future if all concerned will cooperate and make the best use of the knowledge now available. If the student anxious to prepare himself for a useful and effective life, the educator devoting his education and culture to the turning out of a well- developed, well-educated and practical human product and the executives in the electrical industry who are in a position to have the best vision of what is required, will work together on this problem, they certainly can accomplish much.

Always Room at the Top

The old statement that there is always room at the top was never truer than it is today in commerce and industry. How often it occurs that the greatest difficulty is experienced in finding the persons to fill the vacancies left by death or retirement, and while this is conspicuous, in the case of heads of great institutions, it exists in just the same way in the case of the sub-heads, of whom there is a much greater number.

It is not at all uncommon in the present day for a large company to acquire a smaller one principally for the purpose of securing the services of the head of the smaller institution. And to illustrate in another way this dearth of super men capable of filling the biggest of earth's jobs, we can recall many cases where some great property has been seen to thrive and make progress under one man only to retrograde under his successor. In such cases it is impossible to avoid the conclusion that when the able man died or retired there was no one of equal or superior capacity coming along to take his place.

Such situations as I have referred to have not occurred frequently in the electric utility industry, but we are reaching a size and the young men who have grown up with the industry and brought it to this point are reaching a period of life where changes must occur, and therefore, if we are to be alert and progressive and ready for the emergencies, it is important that we should give thought to meeting such situations in our business.

Here, as I have indicated, is a task and a situation in which foresight, proper education and training are most important factors, a situation which should be of the greatest interest to the young men and women of the nation looking for careers, to the educators of the nation who wish to serve by preparing young men and women for effective, useful lives and to the owners, directors and executives of the utilities who wish to constantly improve the efficiency of their service to the public by having superior material to recruit and build up their organizations so that they will render the most complete service in the most satisfactory and economical way.

The very natural way to attack this problem is for the executives of the utilities to turn to the institutions of learning, universities and colleges, present their matter and ask for cooperation. There is little question in the minds of most people at this time that as a preparation for business a college education is very desirable, or to put it in another way, men and women of otherwise equal talents and ability are enough better prepared and consequently enough more effective in business positions if they have college educations than if they have not, to justify the expenditure of the time and money. The utilities, therefore, naturally turn to the producers for their supply of college-bred men and women. In order that these young people may be particularly prepared for the work in which they are going and in order to stir up the interest on all sides, it is desirable to have a very general understanding of the character of the work into which the student is going, so that he may fit in to the best possible advantage and may avoid discouraging experiences and delays in finding himself and getting started. There is so much information which he will want and will have to have that he could so easily acquire along with his other studies and preparatory work that I do not think anyone would question the desirability of such cooperation as I have discussed. Without much study, it is difficult for the college professor or the layman to appreciate the possibilities for the employment of trained men and women in the utility business due to the growing complexities requiring superior training, and also due to the rapid growth of the business and its potentialities generally.

Three Pertinent Questions

May we consider three questions which seem to be very pertinent to this discussion:

1. Why should the young college-bred men and women want to take up work in the electrical industry as their life work?

2. Why should the universities and educational institutions of the country take a great interest in the electrical industry, want to know the most possible about it and want to educate young men and women in a way which will qualify them to do the best and most serviceable work in this industry?

3. Why should the electrical executive want to take into the employ of his company all the specially trained college-bred men and women he can possibly use, and to that end want a close intimacy with the faculties of the nation's higher schools?

Before answering these questions, let us give a little further consideration to the importance of the electric light and power industry and its probable future. Are we wrong—are we egotistical—in believing that our business is quite likely to become the greatest of all businesses?

All business is based on human needs and wants. If the human being sits still upon the earth, he soon dies. If he gets up and becomes active; that is, exerts power and directs it intelligently, he provides himself with the necessities, the comforts and the luxuries of life and living, and the rapidity with which he accomplishes this and the extent to which he goes is primarily dependent upon the amount of physical power at his command. Dr. Scott, President of Northwestern University, has shown in a most interesting way how a high standard of life for the few in past ages was dependent upon some power in excess of the physical power of the individual, generally supplied by slave power and animal power, and how in modern times the new electric power is becoming a substitute, and as a result, even with present development of electric power, there is an equivalent force equal in labor to the labor of many slaves already available to each citizen of our country, which is primarily responsible for present-day prosperity and the great improvement in the standard of living of our people. It would, therefore, seem that the want for power might become the greatest human want as methods for applying it are worked out and as these methods become known to the individual. Mr. Henry Ford is quoted as saying, "Power is the foundation of material prosperity," and also that "This is the age of power." And one hears similar statements on every hand.

However, this does not necessarily mean that the power business will be the biggest business measured in dollars and cents of sales per annum, even though it may be fundamental.

Cost of Power Small Part

As indicated, the modern automobile, the aeroplane, the radio are all dependent for existence, as well as for operation, on electricity. Without electricity we would not have them, and yet the cost of power required in the making of an automobile and the operation of it even including the power required to produce, refine and transport the raw materials, may be only a small part of the price which you pay for the finished motor, so that while power is the dominant factor and controls all the wants, it probably is not the largest item, but even in this last thought we may not be looking sufficiently into the future.

Ten billions of capital is invested in the power business today and the requirements of the people are making it necessary to invest a billion a year at the present time, and this rate of requirement is likely to accelerate, so that I should say it is most conservative to estimate that in twenty years, or at the time when the boys and girls coming out of the colleges today have reached their maximum value, there should be at least forty billions of capital invested in this business.

There is no question in my mind that this industry will shortly pass the railroad transportation business in capital invested and yearly earnings, even were it not almost certain that the operation of all parts of all the railroads by electricity purchased from the power industry is only a short distance ahead.

While it is speculation to attempt to look into the future, it seems reasonable to think that just as we have found ways of transmitting through the air sound and signals which in the early part of the last century we could transmit only by wire (automobiles and aeroplanes have in an experimental way already been controlled and in that sense operated from remote points by wireless), so may the transmission of power by air follow the present distribution methods, opening up great fields for the increased use of power, which, with all the problems of control, distribution, sale and metering which would attend such a wonderful development, will afford fascinating occupation for large numbers of intelligent, trained people.

In short, there is no reason to think that for many years to come the rate of increase in the electrical requirements will not accelerate as compared with the period we have just gone through rather than decrease, and therefore, while I might go into great detail in speculating on what the development may be, I cannot but feel that we are justified in believing that this is a business which any able young person seeking a life work and an opportunity for service may place at the head of his list of possible occupations, and an industry which will have no difficulty forcing itself upon the active attention of those engaged in preparing the young men and women of our nation for the activities of life.

An Active Life of Service

Returning to the questions propounded, the youth should desire to enter the electrical business because it gives him an opportunity for a vigorous, active life of service which is the most worthwhile, in a large and important world's industry, perhaps destined to be the greatest of industries, at good remuneration, with an excellent opportunity to invest his savings advantageously, which is the most sure and honorable way of becoming independent. It brings him into an industry involving some of the biggest and most interesting problems that he will find in any modern world occupation, such as dealing with the human passions, jealousy, envy, personal ambition and greed in organization and overcoming these great obstacles to cooperative progress; the study of human nature and methods of dealing with it to bring out the best in those reactions which develop harmony, collective ambition and all the states of the human mind which result in accomplishment and high production; the art of building the organization where great men with no loss of spirit will work under other great men; intricate, absorbing questions of finance, administration, law and other fields and participation in a business where the opportunities for becoming well acquainted and becoming well known and useful citizens in the community are greater than in almost any other industry.

Interest in Power Industry

The institutions of learning should take a vigorous, personal interest in the electric power industry. First, from the general standpoint, it offers a great boon to humanity, and in order to know all these advantages and derive the greatest benefit from them, general education should involve a rather intimate acquaintance with the up-to-date electrical situation. Further, because of the industry's importance and extremely rapid growth, increasingly large numbers of people will become engaged in it each year, and there is not only a great opportunity of assisting the young people of the nation to get into most desirable occupations, an opportunity to render a great service to humanity by providing most practical education for young men and women who desire to go into this industry and are going into it in large numbers and who very shortly will be dominating its policies, but there is the greatest opportunity of having an important hand in moulding the underlying principles and policies which will govern these utilities a few years hence. Thus, responsibility for the public utility service of the future is now resting upon the shoulders of the educators of the country.

And, lastly, the utility executives should welcome the advent of the college-bred men and women in his business, because it will raise the standard of his company's personnel and will put him in a position to render a better, more satisfactory and more economical service to his public. It will result in the application of brains, modern methods, research and high purpose to his industry, all of which follow in the wake of a well-selected and well-educated personnel. His business will develop scientifically and will grow more rapidly than it would possibly have an opportunity to do if served by mediocre and poorly trained people.

These are not new thoughts: What has already been done to develop such activities and the kind of cooperation we have been discussing? Some sixteen years ago the suggestion was made that relations should be developed between the electric public utilities and the great institutions of learning, and acting on this suggestion, a committee of this Association was formed, composed of professors from a number of the prominent universities and colleges and men prominent in the electric light and power industry. The reason for this desired relationship was that the electric industry was at that time growing at such a rate and furnishing a service of such great usefulness to the people, that those engaged in it began to have some vision of what it was likely to become and to realize that not only should the institutions of learning be familiar with it and up-to-date with regard to it, from the standpoint of general useful information to the great body of their students, but that the industry was requiring more and more college-bred men to take up its work, and it was of the greatest importance that there should be closer relations between the educational institutions and the industry so that these young men would be prepared in a way to make them most useful in the industry in the shortest possible time.

At that time the electrical manufacturing interests of the country had begun to pay considerable attention to the engineering graduates, and the telephone interests also were watching the students through their courses and each was endeavoring to pick out the cream of the men.

Relations with Colleges

This activity on the part of the National Electric Light Association developed the fact that quite a number of electric light and power companies already had relations with their neighboring colleges. The first work of this committee was directed toward accomplishing four things:

1. Assisting faculties, by consultation and suggestion, in the choice of studies for their curricula covering their electrical courses.
2. Working out plans by which more of the undergraduates could get summer work of a class which would be of some value to them from an educational standpoint and at a fair compensation.
3. Furnishing the libraries of the universities copies of worthy and valuable pamphlets and books bearing on the electrical industry.
4. Arranging for an interchange of lectures by electric light men before faculties and student bodies, and by members of the faculties before groups of utility employees.

This committee continued its work up to the outbreak of the World War. Then there was a cessation for a year or two, but after the war the committee was reorganized and has continued with growing interest up to the present time. There is a very excellent understanding on the part of the members of the committee of each other's situation. Through the medium of its various reports, a great many people in the utility industry are informed as to the work of the committee, but until about a year ago its work was not so well known among the educational institutions other than those that had representatives on the committee. Therefore, it was deemed wise to have a representative of the committee who knew the work very well visit the more important educational institutions and familiarize them with what the committee was trying to accomplish.

The committee was most fortunate in being able to make an arrangement with Dean C. O. Ruggles, who at that time had just been called from the University of Ohio to Harvard University, and for that reason could arrange to give more time to this matter than would otherwise have been possible. This was a very happy arrangement, as it would not have been possible to secure the assistance of a man who had a better grasp of the subject, who was better able to present it, or who had as wide and as favorable an acquaintance among college people.

While the primary importance of this relationship between the educational centers of this country and the utilities is the securing of properly trained people for the utilities and the interchange of information which is essential to intelligent prosecution of that work, it is realized by the committee, and was by the original committee, that there are matters of general interest on each side which should be known to both parties, and to the utilities particularly it is of tremendous value to have the benefit of the unbiased views of these men of broadest attainment who make up the faculties of our schools. We have the great forum of the public, but it is not so tangible or accessible as this very logical forum of the leaders of the intelligentsia of the country, and there are many questions which come up in our industry, with regard to which we think we are pretty well informed and of which we believe we are taking a pretty broad view, in regard to which our views may be greatly broadened and and our policies undoubtedly greatly improved by taking advantage of this natural contact.

Relations with Public

The range of these subjects is very wide, involving studies of relations between the utilities and the public, what should be and what is the attitude of the public toward the utilities and the utilities toward the public, what affects this attitude, studies of the relation between large numbers of the people working together cooperatively in one institution like a modern corporation, what conditions are conducive to the most effective work and results, financial questions, engineering questions, sociological questions, matters of research and investigation and almost innumerable questions and angles, all of which have a decided bearing on our business and all of which should receive proper, organized attention in the well-managed institution.

The work of this committee should be receiving the very wide interest and support of the leaders of our industry. The farsighted ones, if not all of them, have begun to concern themselves with finding the well balanced, healthy young people with superior intellects in their respective organizations and training them to fill the important executive positions in the future. Here is a branch of your Association's work which will be of great assistance in this task. I, therefore, commend it to you from the standpoint of your own interests, as well as from the standpoint of the general interest of the industry.

For the Best Interests of All

I fully realize that this relationship between our industry and the educational institutions has been challenged as something improper by certain men in public life and a certain section of the public press, but if we are right in this matter, and I do not think any unbiased person who will take the trouble to learn the facts will think otherwise, this should not deter us. Furthermore, allowances should be made for the necessary time for information as to such activities to be digested by all branches of our body politic. Also, allowances should be made for the fact that, thanks to the sensation-loving proclivities of the average newspaper reader, some of these agencies have personal interests of a circulation character which are served by such attitudes and should not be taken too seriously. Such opposition is, on the whole, wholesome, and despite the fact that many of the statements made by this opposition lack truth and most of the balance are grossly extravagant and misleading, they do tend to develop discussion and careful consideration, and will finally without doubt be found to contribute somewhat to the universally approved plan in the public interest which will ultimately be worked out.

Therefore, as all of the outcome of this situation and responsibility will greatly affect the good of the nation and its people, we hope that this entire matter will receive serious, careful consideration and that all working together we may, with interest and courage, proceed to work out a proper plan of procedure having in view the best interests of our country, our people and our prosperity.

Promotional Domestic Rates

By SAMUEL FERGUSON

I HAVE been asked to talk about electric rates. To many this is synonymous with electric prices, but there is a radical difference, the non-recognition of which often causes misunderstanding.

You have seen statistics that the average price paid in the United States for electricity used in the home is 7.4 cents. This is probably as correct as such statistics usually are, but you would be far from correct to say that 7.4 cents is the average rate at which electric service is offered for home electrification; and yet, this is exactly the impression which is broadcast by those who wish to discover and attack an overbearing power trust.

Let me illustrate by an analogy. Suppose I write and publish a book. I ask the publisher how much it will cost. He tells me $2,600 for the first thousand, and $400 per thousand for each extra thousand. Suppose I order 2000 and, after paying the bill, I find that the books cost me $1.50 apiece.

Now in this case, while it is perfectly true that the average price paid was $1.50 per book, yet that was not the rate quoted, but was the result of the quotation combined with the number I elected to buy.

The resultant bill of $3,000 would have been just the same for the amount I bought if he had quoted me a straight rate of $1.50 per book; but suppose he had quoted this figure per book, and then I had changed my mind and taken some different quantity. He would have been badly stuck if I had taken only 500, and I would have been heavily overcharged if I had taken 5000.

AGAIN, suppose I had a friend who also wanted to publish a book. His would differ from mine only in the fact that it was a good seller, of which large quantities must be printed. Would I be giving him a straight statement if I told him that the publisher, who was known to be a one-price man and played no favorites, charged $1.50 per book, and that if this was too much he had best go elsewhere, or else buy a press and print it himself.

In one respect the book printer and the electric company are much alike in that it costs a great deal to get ready. When once each is ready and has delivered the first book or the first kw-hr., the cost of many more will represent only a small fraction of the cost of the first. When the order is filled, or at the end of the month, the average cost per unit is easily determined, if anyone is interested, but in either case to use this past average cost per unit for the purpose of future price quotations would be extremely fallacious unless the nature of the goods and the quantity were exactly the same as before.

Mr. Ferguson is president of the Hartford (Conn.) Electric Company and a past president of the National Electric Light Association. This article was originally delivered as a graduate lecture in the public utilities course of the Electrical Engineering Department of Yale University.

I believe our statisticians would be able, if they tried, to give us the average price per book for all books printed in the United States; which average figure I have no doubt could be used to prove that United States printers as a class were robbers because of the fact that the average price of the books they printed was much higher than the average of those printed by the Oxford Press; or to prove that some particular printer's prices were either very low or very high because of the fact that his last year's output was sold below or above this average price—which naturally has nothing to do with the case.

My analogy is not exact in that the high cost of getting ready in the case of the printer is due to the operating expense of preparing the plates, etc., while in the case of the electric company, it is due to the capital expense of providing the facilities—the result is, however, just the same in that after these first costs are absorbed, a large amount of additional finished goods can be supplied at a very low cost.

THE illustration I have just used leads directly to a discussion of the fundamental difference between the straight meter rate and the so-called promotional rate for domestic business.

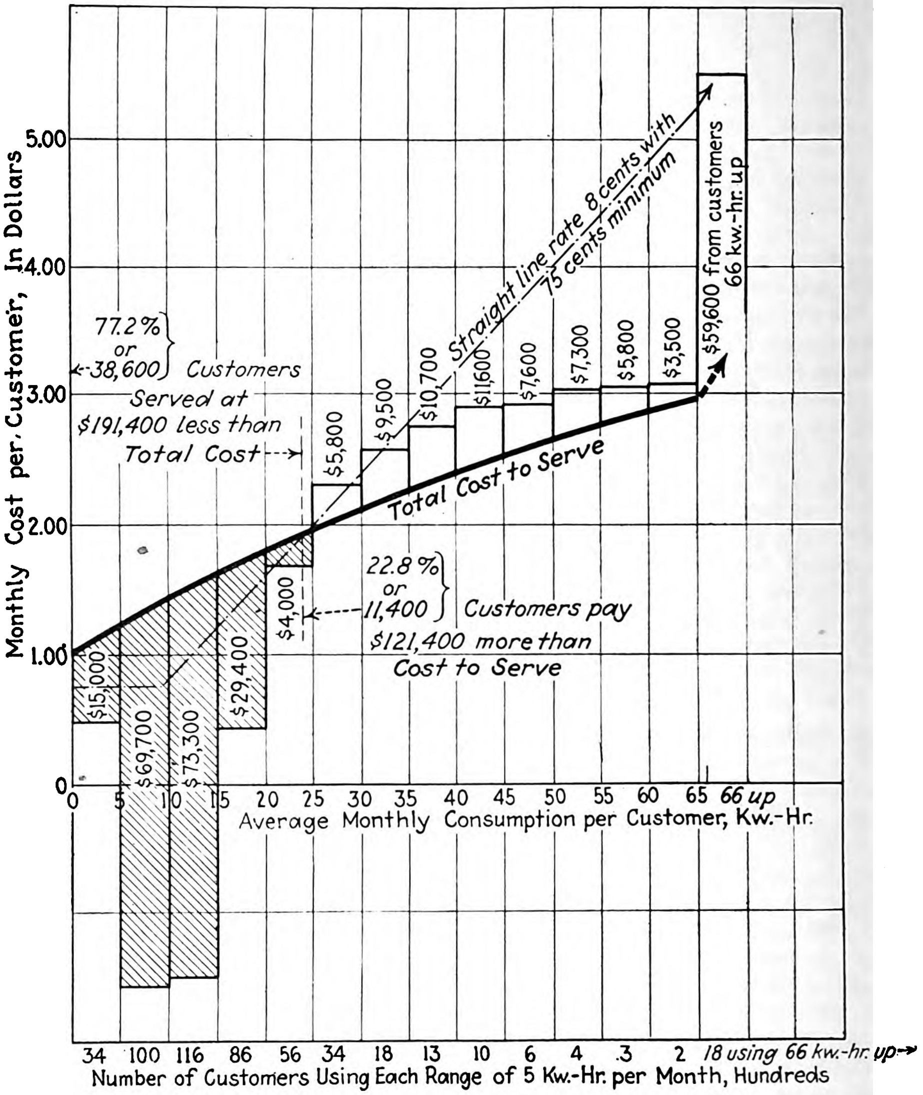
A straight meter rate is the method of charging for all kw-hr. sold, at a price which past experience has shown to be necessary in order to cover the costs of all kw-hr. previously used in a given community. It is exactly analogous to the printer quoting as his price the figure of $1.50 per book, which past experience has shown to be the average price which he has received. In neither case does it take into account the much lower cost of furnishing additional amounts of the finished product beyond the amounts which have, in the past, been furnished; and in both cases if the goods are furnished in small amounts they will be furnished at a loss, which is made up from overcharges on those who buy more than an average volume of books or kw-hr.

The promotional rate, on the other hand, recognizes in its very form the fundamental fact that while the costs of getting ready are high, the cost of the finished product is low provided the "getting ready" item is billed separately.

Everyone recognizes that the promotional rate is logical and equitable in the case of the printer because the process of making books is known, and there is nothing mysterious about the fact that typesetting is an expensive job, while the added cost of the finished book is not much more than the cost of the paper and ink used. But when your meter registers kilowatt hours, it is not at all obvious why there should be exactly the same price differential between some kilowatt hours as there is between the first book and subsequent thousands. As a matter of fact, the cost of getting ready is much higher relative to the cost of the finished unit in the electric business than in the printing business; so much so in fact that the customer is never even asked to reimburse the companies for the cost of getting ready, but only for the annual fixed charges on this cost which is termed a capital expenditure.

The promotional rate may appear in any one of a multitude of forms. Much ingenuity has, indeed, been expended in camouflaging it because of the fact that its equity was not generally understood; but it always has the essential feature that part or all of the fixed costs which do not vary in proportion to the amount of current used are covered either by a fixed monthly charge with a correspondingly low charge for the kilowatt hours used, or by assessing this fixed charge in the price of the first few kilowatt hours used rather than as a separate item.

The higher the fixed charge and the lower the energy charge (within the limits of actual costs of each) the more equitable is the rate, as more nearly representing actual conditions; and the more useful it is as making possible for the user a greater degree of electric service in the home; and the more satisfactory it is to the company in that it stimulates a greater rate of growth.



Courtesy of C. F. Lacombe, W. S. Leffler, 11 W. 42nd St., New York

Fig. 1

Typical Straightline Rate Showing Profit and Loss for Residence Customers

THERE are many degrees of promotional rate, some that vary only slightly from the straight meter rate, some that differ materially, but very few that go even approximately as far as cost analysis indicates to be logical.

The reason for this is, of course, the fear that the public will misunderstand; and also the tremendous political and sentimental pressure exerted on companies to lower the maximum rate previously charged. Companies should not try to go too fast even along the right lines, because they must remember that it is they themselves and the gas companies before them that have educated the public to the idea that kilowatt hours can be sold like sugar at so much per unit.

It is logical for the grocer to sell sugar by the pound because the cost per pound to him represents the major portion of his unit costs.

On the other hand, it is equally logical for the telephone company to sell its local service for a fixed price per month, which price will cover the annual fixed charges of the subscribers' share of the total investment.

The electric business, is, however, in its nature a combination of the grocer and the telephone company in that it supplies a commodity—i.e. coal in the form of kw-hr. and also furnishes a facility—i.e. poles, wire and plant in exactly the same manner as does the telephone company.

What the telephone company actually delivers to your house is electricity just as does the electric company, but in minute amounts. What you want is ability to communicate, and you do not care how it is done. What you want of the electric company is light, heat and power service, but from habit you scrutinize the kilowatt hours which produce these services rather than the services themselves, and you are liable to feel that all kilowatt hours are the same and identical in cost and, therefore, should be in price.

These general statements are sufficient to outline the fundamental differences in the two methods of charging. I wish now to discuss the specific application of each method to a concrete case.

Figure 1 shows the results of a straight meter rate of 8 cents per kw-hr. (minimum charge of 75 cents per month) compared with the costs of a particular company as analyzed and drawn as a curve.

Before going further, let me state that no cost allocation can be 100 per cent correct because of the fact that no two persons will allocate every item of cost in exactly the same manner, but this is no reason why we should not make the allocations to the best of our ability, with the admission that some other allocations, if honestly made, may give a slightly different curve, and are just as likely to represent actual facts as your own allocation.

Therefore, let us take the particular curve for purposes of illustration only understanding that while it may be a little high, or a little low, either in absolute amounts or in slope, it is sufficiently close to the fact so that conclusions drawn therefrom will not be in material error.

You will note:

1. That the abscissa represents the use per month of relatively small amounts of current and the ordinate the monthly bill or cost corresponding thereto.
2. That the cost curve starts at about one dollar for no consumption at all, and increases to about three dollars for use of 65 kw-hr. per month.
3. That the price and costcross curves at 24 kw.-hr. per month, and that at this point, and only at this point, is the price a correct one from a cost standpoint. (I should have stated before that in the item of cost is in-

cluded a return of 8 per cent on the investment required for rendering the service.)

4. At the bottom the chart is indicated (in hundreds) the number of customers in each consumption classification.

5. The shaded blocks represent the total annual losses in dollars for each classification which results from the fact that at these points the price curve falls below the cost curve.

6. The unshaded squares which appear above the 24 kw-hr. point represent the amounts of the annual overcharges paid by customers using more than this amount of current per month, as calculated from the amount the price curve exceeds the cost curve at the various points.

NOW let us see what are the conclusions which must be drawn from these observations:

The 11,600 customers in the classification using from 10 to 15 kw-hr. per month are served at an annual loss of $73,000, or about 50 cents a month each.

It would seem as though this 50 cent loss was too small a matter to talk about except for the fact that 77 per cent of the total number of customers are thus carried at a loss; and the small monthly loss on each reaches the tremendous yearly total of $190,000 when multiplied by the number of losing customers which loss has to be made up on the remaining 23 per cent of the customers.

Reducing this 50 cent loss to terms of kw-hr., it means that these customers are undercharged 4 cents per kw-hr., or approximately 35 per cent. This situation is probably eminently satisfactory to the small user who has no vision of what electricity is able to do for him in the way of increasing his comfort and decreasing his living expenses, but it cannot be equally satisfactory to those who wish to make real use of electric service.

In the case of the 200 customers using from 60 to 65 kw-hr. per month, the charge clearly shows an overcharge of about $2.00 per month. This reduced to cents per kw-hr. shows an overcharge of about 3 cents per kw-hr., or 60 per cent above the cost curve figure of about 5 cents. If it were not for this overcharge, he could for the same monthly payment have had the benefit of more than twice the kw-hr. actually used.

Obviously, if the necessity for an overcharge were removed, and the price correspondingly reduced, all customers would take advantage of the opportunity for greater use and move from the present classification to one further to the right—and this applies equally to those in the small classes where such procedure would of necessity increase the monthly bills of those who did not take advantage of the opportunity to use more.

The net result of the straight line method of charge is then to give a picayune subsidy of *one or two* cents a day to a large number of customers, which subsidy is paid by a smaller group. This in itself would not be so bad if it were not for the fact that the high rate quoted for the more liberal use prevents both groups of customers from using current as liberally as most of them would like to do.

THE public wants the comfort in the home of the many electric aids that exist today, but it cannot afford their use because of the prevailing prices of electricity. The public feels that the utilities should be able to give the greater service which is needed at sufficiently lower unit prices, so that liberal use does not result in a prohibitive bill; and they know that the utilities generally are not so doing. A fallacious but most natural inference follows.

You would say, "If a utility can supply all the electricity needed in a fully electrified house at two or three cents a kw-hr. (which price I could afford to pay), and if that utility insists on charging two or three times this amount, the answer is that the utility is profiteering, and making unreasonable profits." This conclusion is also supported by the fact that the market value of that utility stock has been increasing to a very material degree during the past two or three years.

Consequently, the apparent though not real solution is to strike at the utility's earnings as excessive, and as the only thing to hit seems to be the maximum rate it charges for domestic electricity, you attack that rate as unreasonable. What happens then is that the utility is placed on the defensive and produces evidence to prove, or try to prove, that its earnings are not unreasonable, and that therefore, you should not be so unkind as to object to its rates; and no matter how the rate case ends, you are the loser.

It may look like a victory to have the Commission and Courts decide against the company, and compel a reduction say, from seven to five cents per kilowatt hour, but I ask you if even then you are any nearer to your objectives? There are only a few homes that can afford electric cooking, refrigeration and hot water at the reduced price of 5 cents any better than they could before, and owing to the fact that the company's earnings are greatly reduced by your victory, it has no great enthusiasm about giving you the 2 cents or 3 cents energy which you so badly need in your home, nor could it if it would.

Do I hear you say—"But, at least, it is a step in the right direction?" The message I wish to leave with you is that such a victory is in reality a step backward, and one that makes it almost impossible for the company to give you what you need and desire.

IT has been often urged that a subsidy such as the chart indicates, given to 70 per cent of the customers, is equitable because they are probably poor and need the help. But is such an argument sound? It is not for two reasons:

1. The "limited use" customers are not the poor, but are the wealthy who live in apartment houses and go out for their meals, and can afford flesh and blood servants at $75 per month to do their work.

The poor do their work themselves and are the ones who need the help of the electric servant, whose wage is hardly 5 per cent of the amount paid to the other kind.

2. Even if they were the poor—by what right does the Utility or the Commission undertake to rule that you who wish to use liberally shall have collected from you in your monthly bill a subsidy to be given to the poor so that they can have light at 2 cents a day less and thereby be enabled to buy an extra loaf of bread each week.

Your charities, good and noble though they be, should not be mixed up in your bill for electric service, and they are so mixed whenever rates are such that 70 per cent of the customers are carried at a loss—made up by the contributions collected from the other 30 per cent.

The tabulation in Fig. 2, below, shows a different aspect of the case. Here are figures giving a seven-year record of two companies,—Company (A) using straight meter rate; Company (B) using a promotional rate.

STRAIGHT vs. PROMOTIONAL RATE

COMPANY A.

Year	*Average Domestic Price Cents*	*Kw.-hr. per Customer*	*Average Revenue*
1922.........	?	298	?
1923.........	?	307	?
1924.........	9.0	324	$29.00
1925.........	8.5	329	28.00
1926.........	8.0	352	28.00
1927.........	7.0	378	27.00
1928.........	6.0	407	24.50
1929.........	5.5	430*	24.00

*Partly estimated.

COMPANY B.

Year	*Average Domestic Price Cents*	*Kw.-hr. per Customer*	*Average Revenue*
1922.........	8.6	286	$24.50
1923.........	8.0	316	25.00
1924.........	7.6	341	26.00
1925.........	7.1	357	25.50
1926.........	6.8	386	26.50
1927.........	6.4	431	27.50
1928.........	6.0	478	29.00
1929.........	5.5	535*	29.50

*Partly estimated.

Fig. 2

You will note that the use per customer which is a measure of the service rendered has increased in the case of (B) from 286 to 535, or an increase of 87 per cent, while in the case of (A) the increase is from 298 to 430, or an increase of only 44 per cent.

It is obvious that as a useful servant to the community Company (B) excels.

Now the interesting point is that the average price during the major portion of the period has in both cases been practically the same, starting at 9 cents per kw-hr. and coming down to 5½ cents, but in the case of (A) it has been done by reducing the maximum price while (B) has not touched the maximum price, but has applied all reductions to lowering price quoted for additional kw-hr.

NOW look at the results to the company—A (Fig. 2) has gone down in revenue received, from $29 to $24 per customer, while B has gone up from $24 to $29 per customer, and is, therefore, in a position from an earning standpoint to keep on going down in price, while A can hardly do much more than it has done already, unless some other class of business will carry the losses which must accompany a further decrease below $24 per customer. That this revnue per customer is about the low limit can be seen by comparison with the service-at-cost prices charged in Ontario where there are no items of fuel, taxes and profits to be considered.

Recently the City of Toronto increased its domestic prices because they were not self-sustaining in spite of the fact that its revenue was approximately $23 per customer. If in Canada, served by Niagara Falls water-power, with no fuel, no taxes nor profits, $23 is not self sustaining, we can hardly expect $24 to cover all the existing Canadian costs and these three items in addition.

The fact that in Canada each customer obtains for his $23 many times as many kw-hr. as here is quite beside the question, as can be seen from the analogy of the cost of printing books; since what corresponds to the paper and ink is, in the electric business here, largely fuel, and with this absent in Canada there is not even the small added cost for increased use that we have on this side of the border.

The large Canadian average use divided into a perfectly normal monthly payment is what makes true the widely heralded low Canadian domestic prices when stated in the terms of cents per kw-hr. or in terms of service rendered. Our problem is to build up our service rendered to the same high point as theirs, and then, with the same amount used, our prices can be as low as the Canadian save only for about 8 mills per kw-hr. to cover taxes and fuel. I make no allowance for profits as they can come from the superior efficiency of private as compared with municipal operation.

IN Canada, because of the fact that the price of coal is high to manufacturers, it has been possible for the Hydro Commission to make sufficiently large profits from the sale of its water-power to industries so that the losses incurred by dropping the maximum rate for household use to very low figures could be made up from industrial customers, instead of from other domestic customers. This is, however, a very special case, and due wholly to the combination of high coal price and the almost unlimited water-power of Niagara. In this country, if a utility should try the same method, industries simply would not stand for it, but would manufacture their own power with the result that the share of the poles and wires now carried by them would have to be carried by others.

It has been often hotly denied that in Canada domestic business is or ever has been carried by either the taxpayers or other customers, but I think the tabulation in Fig. 3 will tell the story. These figures are official for the City of St. Catharines:

	Per annum
1915—Revenue per domestic customer..	$8.00
1928—Revenue per domestic customer..	23.00

If a customer in 1928 had to be charged $23 in order to be served at cost, what possible chance is there that in 1915 an annual charge of only $8 would cover the cost. While it is true that all items of cost are higher in 1928 than in 1915, still they are nothing like 3 times as great. It is also true that in 1928 customers used very many more kw-hr. than in 1915, yet where there are no fuel bills to pay, or taxes based on the volume of business, the increased use cannot justify any material difference (based on cost) in required revenue.

ANNUAL BILL—ST. CATHARINES

	Per Domestic Customer	
Year	*Kw-hrs.*	
1915	230	$8.02
1916	291	8.08
1917	397	9.28
1918	492	10.26
1919	562	11.36
1920	819	13.03
1921	1027	14.50
1922	1162	15.10
1923	1168	17.28
1924	1603	18.94
1925	1643	19.30
1926	1720	20.50
1927	1800	22.00
1928	?	23.00

FIG. 3

The obvious explanation is that whether or not $23 in 1928 covers the full cost of service, certainly $8 in 1915 did not do so and, therefore, the domestic customer in 1915 was served far below cost, which loss had, of necessity, to be made good from other sources.

PERSONALLY, I think it was a very good plan to follow such a policy as it brought up the average use per customer to about five times our American figure in a very short time, and I would be glad to do so also provided I could find a good Santa Claus who would make up the deficit which obviously existed in this case for many years; but I have sought him in vain, and therefore, since I cannot find him, I believe we should do the next best thing; namely, to make our rates low for the additional kw-hr. which we offer to all customers, but to keep up the rates on small convenience use to a point which will avoid excessive losses. That no such easy method for developing a large use as that employed in Canada is open to us is unfortunate; but the public will not excuse us on this account for failure to produce the desired results.

We shall surely be judged by results and by results alone. There is only one path by which we can reach the same results, admittedly much slower than the easy one adopted in Canada, but I heartily advocate following it just the same. It consists of a rate structure so shaped as to eliminate the losses which are inevitably incurred by low prices to small users, but which will automatically give a low price with liberal use.

Those companies which yield to the demands of political agitation and grant lower and still lower maximum rates are simply laying up trouble for themselves very shortly. To make the maximum price 6, 7 or even 8 cents per kw-hr. without safeguards against the losses incurred by reason of the ten or fifteen-dollar a year customer, is to invite thousands and thousands of nonprofitable customers, which losses must be collected from the liberal users instead of permitting the latter to enjoy the rate which their use would otherwise permit them to earn.

It is natural for the popular cry to be for lowered maximum prices, but this is only because through their lack of knowledge, the public are complaining about the wrong thing. The attack on our maximum rates is coupled with the claim of excess earnings, which naturally irritates and puts us on the defensive.

What the public really wishes is the ability to use electricity liberally at reasonable prices, and because its attack is misdirected at our earnings and maximum prices is no reason why we should not make every effort to give the universal service which is needed.

TO illustrate, let me tell an anecdote: Last year the customers of a small unit in a large holding company brought a rate case before the Commission. The day before the hearing the lawyer came to consult me as to the course he was planning to pursue. He had followed the usual course and was vigorously protesting the existing 15 cent rate on the ground that it was excessive, and that it produced excessive earnings.

I explained to him that the company would have no trouble at all in beating him, as with the existing small use, the earnings could not be excessive; but that what he really wanted was an optional rate, which would automatically produce a low price for a liberal use. So he tore up his case and made the statement at the hearing that the petitioners recognized the 15 cent rate as reasonable, and that under existing conditions, earnings were not excessive, but that still they were dissatisfied because they were not accorded the service of which the company was capable. and were not able to use electricity liberally except at a prohibitive cost.

THE rate expert of the holding company asked for an adjournment because, as he stated, he found himself in the unusual position of having to agree with every contention of the petitioner. Naturally, things were easily fixed to the satisfaction of every one during the recess by filing of an optional schedule of the promotional type.

For several years I have felt that those companies which still stick to the old-fashioned straight meter rate were losing an opportunity for increased profit and usefulness, but a study of the situation as it exists today convinces me that they are also inviting very serious consequences to be expected from public unrest, and at a no remote period.

That I may not reach the goal I set for my company in the appointed time is no reason for not having a definite program, which program is that within five years every customer who wishes to make full use of electricity in his home for light, refrigeration, cooking, hot water and miscellaneous services, shall be able to do so at a rate not to exceed 2½ cents per kw-hr.; and that the average usage shall be so increased that as a result the average revenue from my domestic business as a whole shall be below four cents per kw-hr. for an average of 800 kw-hr. of service.

That this goal is not so very difficult to attain is indicated by the fact that many customers in fully electrified homes are now earning average prices as low as 2 cents per kw-hr., and that in the past few years the average domestic bill has increased from $24 to $29 in spite of a reduction in average over-all unit price of from 9 cents to 5½ cents per kw-hr.

The low resultant unit price for full use in the home obtainable with a system of promotional rates is illustrated by the bill reproduced below. In Fig. 4 you will note that this customer paid $22.33 for 1149 kw-hr., or slightly less than 2 cents per kw-hr. If, however, he had been burdened by making up losses incurred on a multitude of "limited-use" customers served below cost, the rate charged would have had to have been 5½ cents and the resultant bill would have been prohibitive in amount.

I HAVE been severely criticized for using this bill as an illustration, on the ground that it was probably that for the largest domestic use among all of the wealthiest users. As a matter of fact, the largest home-use on our lines is three times this amount, and this particular customer instead of being one of our wealthy citizens is a typical high-grade New England workman who works at a machinists's bench at the Underwood Typewriter Company. The bill is about 10 per cent of his wages, but his statement is that same is not an extravagance as he saves the full amount from other bills which he otherwise would have to pay, and in reducing the labor items in the home.

Inasmuch as the amount used is 25 times that of the present average customer, it is obvious that the companies have before them an almost unlimited field for useful service, if only they will make their rate schedules conform to actual cost conditions rather than to past averages.

Fig. 5 (on page 414) is shown partly for its interest and partly that something in my talk shall bear directly on the subject which I have been asked to discuss; namely, the effectiveness of the promotional rate. The chart shows that from 1916 to 1922 the use per customer did not increase materially. The drop in 1918 and 1919 was, of course, due to war time conservation efforts.

Inasmuch as during the whole period from 1916 to 1928 the same policy and approximately the same degree of effort had been expended on sales effort, some other explanation is necessary to account for the very marked change which obviously began in the year 1922.

The fact that the promotional rate was installed at that date, since when the use has increased to 174 per cent of the 1916 figure, must at least furnish food for thought.

Fig. 6 shows another illustration of the increasing degree of service which a company with a "promotional" rate can render.

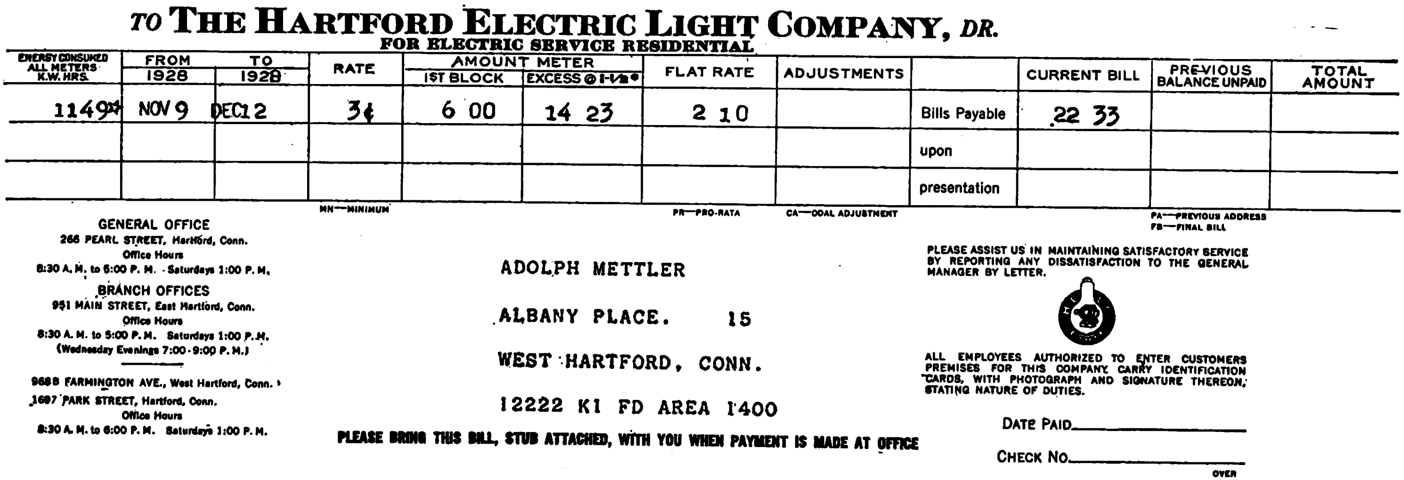
CLASSIFICATION OF CUSTOMERS BY USAGE

Per Cent of Customers in Each Class

Yearly Kw-hrs. Used	*Hartford Year* 1921	*Hartford Year* 1928	*Co. X Year* 1928
0-120......	17	7.1	26.8
121-240......	37	20.8	40.4
241-360......	25	22.2	18.0
361-480......	11	16.3	6.2
	—	—	—
Total under 500	90	66.4	91.4
481-600......	4.7	10.8	3.2
601-720......	2.5	6.5	1.4
Over-720......	2.8	16.3	4.0
	—	—	—
Total.......	100.0	100.0	100.0

FIG. 6

You will note from this table that in the case of Hartford in 1921 (with



TO **THE HARTFORD ELECTRIC LIGHT COMPANY,** *DR.*

FOR ELECTRIC SERVICE RESIDENTIAL

ENERGY CONSUMED ALL METERS K.W. HRS.	FROM 1928	TO 1928	RATE	AMOUNT METER 1ST BLOCK	AMOUNT METER EXCESS @ 1-1/2¢	FLAT RATE	ADJUSTMENTS		CURRENT BILL	PREVIOUS BALANCE UNPAID	TOTAL AMOUNT
1149	NOV 9	DEC 12	3¢	6 00	14 23	2 10		Bills Payable	22 33		
								upon			
								presentation			

MN—MINIMUM PR—PRO-RATA CA—COAL ADJUSTMENT PA—PREVIOUS ADDRESS FB—FINAL BILL

GENERAL OFFICE
266 PEARL STREET, Hartford, Conn.
Office Hours
8:30 A. M. to 6:00 P. M. · Saturdays 1:00 P. M.

BRANCH OFFICES
951 MAIN STREET, East Hartford, Conn.
Office Hours
8:30 A. M. to 5:00 P. M. Saturdays 1:00 P. M.
(Wednesday Evenings 7:00-9:00 P. M.)

968B FARMINGTON AVE., West Hartford, Conn.
1697 PARK STREET, Hartford, Conn.
Office Hours
8:30 A. M. to 6:00 P. M. Saturdays 1:00 P. M.

ADOLPH METTLER
ALBANY PLACE. 15
WEST HARTFORD, CONN.
12222 K1 FD AREA 1400

PLEASE BRING THIS BILL, STUB ATTACHED, WITH YOU WHEN PAYMENT IS MADE AT OFFICE

PLEASE ASSIST US IN MAINTAINING SATISFACTORY SERVICE BY REPORTING ANY DISSATISFACTION TO THE GENERAL MANAGER BY LETTER.

ALL EMPLOYEES AUTHORIZED TO ENTER CUSTOMERS PREMISES FOR THIS COMPANY CARRY IDENTIFICATION CARDS, WITH PHOTOGRAPH AND SIGNATURE THEREON, STATING NATURE OF DUTIES.

DATE PAID__________

CHECK NO.__________

OVER

FIG. 4

Fac-Simile of Actual Bill

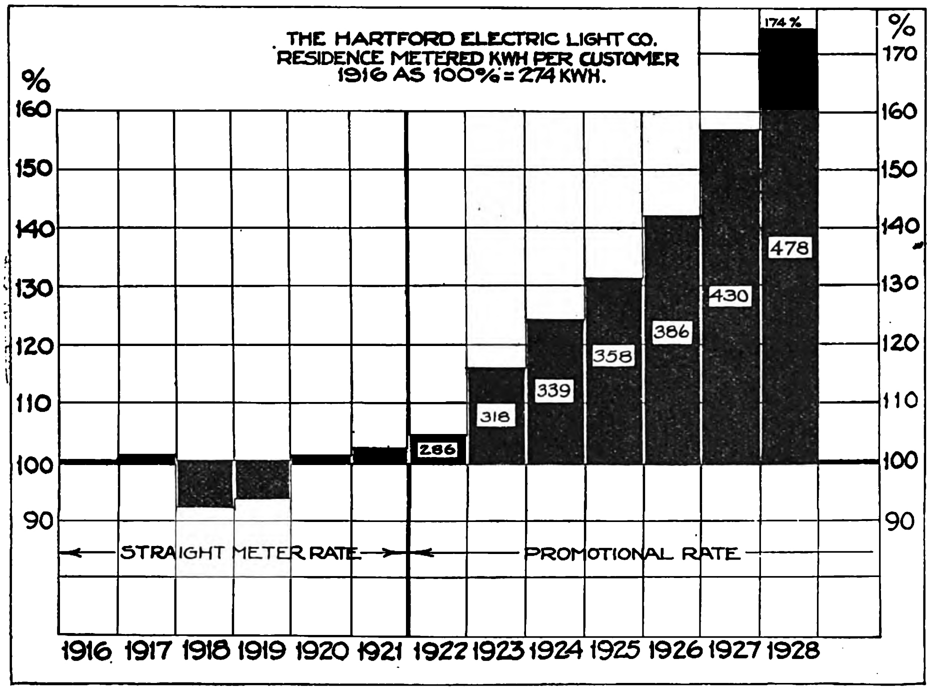


FIG. 5

a straight meter rate) 90 per cent of the customers used less than 500 kw-hr. per year. This percentage also holds true of Company X even in 1928. In the case of Hartford in 1928 (with "promotional" rate) the percentage of those using less than 500 kw-hr. had dropped to 66 per cent.

The class of those using more than 720 kw-hr. is also interesting.

The increase in Hartford, from 1921 to 1928, was from 2.8 per cent to 16 per cent, while in the case of Company X the 1928 figure was only 4 per cent.

It is impossible to study such tables as these without being in every case impressed with the greater value to the user as well as to the company of a rate which permits of a low price for additional use.

JUST one further illustration—last year the farming community of East Hartford, consisting of about thirty farmers, wanted electric service. They are located in the heart of the hills, about 25 miles from Hartford, in territory not covered in the franchise of any electric company; so they arranged to buy current wholesale at the town line for 2½ cents per kw-hr., and went ahead and built their distribution system complete with meters and transformers. This came to about $12,000.

They were now faced with the question of what price to charge themselves for current so that they could make ends meet. In order to cover local expenses and interest, as well as to maintain the lines, they found that they would need to collect about $1,500 a year above the power bill of 2½ cents per kw-hr.

They found that in the neighboring towns the average use did not exceed 500 kw-hr. per customer per year, and that, therefore, they must charge 13 cents per kw-hr. to come out whole on such average amount of use. They recognized at once that if they charged 13 cents no one could afford to use ranges, refrigeration, water heaters, etc.

As a solution they divided the needed $1,500 among themselves in a fixed monthly payment, graded according to size. This average $4 per month, and then they were free to fix a price of 3 cents per kw-hr. for the current used. Under this condition all the comforts of home electrification are available to each, whereas if all costs were to have been assessed against the kw-hr. sold, the initial price of necessity must have been so high as to prohibit the use of any but the most limited degree of service.

The goal of all companies should be the rendering of the utmost service in return for liberal dividends to be earned therefrom, and the important point to remember is that under the American concept of equitable regulation (every class to be self-sustaining) the above-mentioned goal can never be reached by any company which invites the tremendous volume of losing customers which is the inescapable corollary to a low maximum rate.

I believe that the best interests of our domestic customers would be promoted if it were illegal for any company to ever lower the maximum rate charged for small usage, but instead all corporations should more and more lower the quotations for all electricity, which is, or which may be, used after the costs of getting ready are liquidated.

CONVENTION ADDRESSES

(*In Pamphlet Form*)

A number of the addresses made at the Fifty-Second Convention of the Association have been printed in pamphlet form of a size suitable for mailing in a 4 x 9½ in. envelope.

Titles of pamphlets and authors are:

"The Part Electricity Can Play in Better Home Management", *by Miss Lita Bane*

"Sales Increase or Rate Increase?", *by M S Sloan*

"The Customer's Side of the Meter", *by A. W. Robertson*

"Factors in the Progress of a Great Industry", *by P S Clapp*

"The Trend of the Times", *by David Lawrence*

"The Professional Motive in Public Utility Management", *by Deane W Malott*

"Industrial Development in the United States and Canada—1927 and 1928", *by J L Madden*

"Science and Progress in the Industries", *by J J Carty*

"Practical and Economic Aspects of Standardization", *by L L Elden*

"The Cooperative Work of the National Electric Light Association", *by P S Arkwright*

"Super Humans for Better Institutions", *by J F Gilchrist*

"This Half Century of Unparalleled Advancement", *by J H Barnes*

"The Electrical Industry and Its Public Relations", *by J F Owens*

"The Public Right as to Electric Rates", *by W L Ransom*

"Public Utility Regulation and Its Accomplishments", *by Wm J Hagenah*

Public Policy Committee Report, *by R H Ballard, Chairman*

These pamphlets will be sold by the Association at a nominal cost, in any quantity desired. Prices may be had upon application.

NATIONAL ELECTRIC
LIGHT ASSOCIATION
420 Lexington Ave., New York N. Y.

This Half-Century of Unparalleled Advancement

By Julius H. Barnes

THIS occasion marks the Golden Jubilee of the Electric Light. It provides, as well, a popular testimonial of admiration and affection for the inspired labors and for the simple life of America's foremost inventive genius. Fifty years of spotlight distinction have invested his character with a national regard bordering on reverence. That half century of time spans a period in history of most intense human interest. Certainly no other half century in world history could possibly have equalled the myriad changes of this single era. The contrasts disclosed by a comparison of the living habits of these dissimilar days have clearly widened the horizon of human health, welfare, opportunity and content.

A Life of Unique Distinction

A peculiar interest would attach to that comparison because these changes have come within the span of a single life. When that single life itself, as in the case of Thomas Edison, has been also a potent force in working the miracles in modern science and invention, it acquires a unique distinction. It would be title clear to fame for a single mind to carry into practical perfection a device for lighting which has been improved but not displaced by fifty years of intensive inventive progress. But Edison's distinction rests not alone upon the idea of a light itself, but on the wider, daring conception that the subtle force of electricity could be harnessed to control, and be distributed flexibly at point of use. Even Edison's painstaking study, and even Edison's soaring imagination could not at that early day have visualized that the wire which entered America's homes for lighting would have later become the channel of fluid power which established in every individual home its own power plant. It would be interesting if today there could be preserved the changing images of the inventor's mind as he saw the feed wire, planned for simple lighting alone, drawn upon in the course of time to successively operate the electric iron, the vacuum cleaner, the washing machine, the electric range, the refrigerator and the radio. So, also, it would be interesting to visualize the successive steps, with accelerating speed, by which the flexible power distribution of which he was the pioneer, so proved itself in competitive use for industry that it has revolutionized the power plants of our factories.

Mr. Barnes is chairman of the Chamber of Commerce of the United States and was president of the Chamber during 1922-1924. He is president of the Barnes-Ames Company, wheat exporters and is connected with other business firms. During the war he was president of the United States Food Administration Corporation, and has rendered other important public services to this and other countries.

This address was delivered during the Fifty-Second Convention of the National Electric Light Association at the Public Policy Session.

Industry has always had its sources of power: the water wheel, fuel generated steam, the combustion engine—but none of these serves industry so directly and with so much economy as does the flexible force carried to its point of use through the distribution inspiration of Thomas Edison. His concept of fifty years ago of ready distribution, limited in vision as it was, of necessity, in that day, is the basis today for American homes freed of household drudgery; of American farms lifted from the shadow of relative isolation; of industry that has put a premium on intelligence and skill and lifted the crushing burden from the bent backs of labor. Flexible power, easily transported, is the moving force in successive inventions that raises steadily the general average of possession and living.

The science of electricity is indeed of world-wide origin and development. The super-intellects of all peoples have contributed to its understanding and its use. We measure the practical unit of electrical resistance today in the name of the German scientist Ohm. We measure the flow of electric current along a wire in the name of a French mathematician, Ampere. We measure the force required to cause a current to flow against resistance in the name of the Italian physicist, Volta. We express the unit of electrical power in the name of a Scottish engineer, Watt. But in all of America and throughout the world, every shade and variety of electrical service, the finest of subtle pulsations and the most tremendous physical forces are expressed to every ununderstanding with the single name of Edison. No single mind today has contributed so largely to our whole social advance, and when, as well, that single life has preserved the simplicities of living unswayed by an adulation which falls to few men in history, it is the reassurance also of the real quality of America. All America does itself honor to honor in this Golden Jubilee the intellectual achievements and the personal qualities of the man whose name is inseparably linked with that subtle fluid energy which is the very life of modern living. His name will be remembered as long as man can speak and as long as man can hear.

A Half Century Ago

Now, half a century of human progress spanned in this field by a single life, and that life the acknowledged leader, must present comparisons of extraordinary popular interest. What were the habits of industry; what were the social customs; what were the popular conceptions and ideals of the world of fifty years ago, and how have they changed for good or ill? Since the daily press of a people probably most accurately reflects the everyday practices and customs which enable us to gage the conditions of their living, it is interesting to go back to the newspaper of half a century ago.

For example, in *Leslie's Weekly* of 1879 there is a news item recording a patent granted Thomas A. Edison for electric lighting apparatus—an insignificant item in itself, and manifestly conveying at that moment neither to publisher nor to public anything of the vast import which fifty years of history have since recorded.

Something of the coming revolutionary character of this invention is shown shortly thereafter when the New York *Sun* comments editorially on the panic in gas company shares which had been occasioned by the manifest progress in electric lighting. The editorial suggests that the investment in gas manufacture and distribution might be saved "if gas could be made available for cooking, and ladies could thus become expert cooks." As a matter of normal development since, gas has become the universal cooking fuel of our great cities, and, of course, every lady in this audience and that of the radio can testify that she has become, and is, an expert cook. Otherwise, how account for the spread of the delicatessen and its ready-cooked foods?

Pioneer Advertisers

Advertising in the newspaper of fifty years ago averaged about 20 per cent of its content, and today 60 to 65 per cent, although today's news columns cover home and world news with a completeness which was not possible with the limited communications of those early days. This is why you buy a daily newspaper today for half the price, though with four times the news. The limited advertising of New York newspapers fifty years ago, however, shows a continuity of American business which is extraordinary—Lord & Taylor, Daniels, Stern Bros., Macy's, Hearn's, Altman's, Sloane's. Their vast assortments and their imposing buildings in the very heart of Fifth Avenue fashion today are the half-century outgrowth of dependable merchandising which, at reasonable prices, pioneered the columns of half a century ago. Knox hats, Cuticura soap, Worcestershire sauce, Royal baking powder were then taking their first uncertain steps which have made them household names today. Colgate's soap showed a pioneer initiative in eliminating the depression of summer trade by advertising then that "since the soap improves by age and drying, a supply laid away by families leaving the city would be found improved on their return in the fall."

There was a large advertisement in which all visitors to New York were entreated not to fail to see the electric light "now in use at Nicoll the Tailor's," and which added, further, that they possessed a telephone for customers' use and that steam machinery was used in running sewing machines and all scientific improvements. Here was merchant resourcefulness applied certainly with foresight and vision, though if today's 300,000 daily visitors to New York should attempt to see the electric light in the present shop of Nicoll the Tailor, still on Broadway, it would, of course, require the police reserves.

What the Newspapers Lacked

There were no newspaper advertisements, of course, of automobiles or accessories, the backbone of today's newspaper and magazine support; no office equipment, no sports, no apartment or office buildings, no radio, no airplanes, no public utilities, no banks with page spreads or companies offering securities in nation-wide industries, no foreign securities offered to the American financial market. There was no refrigeration, no advertisement of electric devices or gas appliances. There were no advertisements of summer resorts or hotels. Evidently the American clientèle that could travel or take vacations was too small to carry the expense of appeal.

There is an interesting sidelight in the advertisement of the elevated roads of New York, on which the traffic was made to bear what it had to, by charging ten cents fare between 5.30 and 7.30 a.m. and ten cents between 5 and 7 p.m. Between-times you could travel for a nickel. Think of the working conditions of fifty years ago, which made the morning rush hour of city transit start at 5.30 a.m. and end as early as 7.30 a.m. Those are the hours today at which you could be sure to find a seat. The evening rush hour, which then extended to 7 p.m., is today finished by 6 p.m. The shorter working day which this so vividly illustrates not only marks the conquest of extreme drudgery in daily occupation, but it is beginning to be intelligently understood by industry itself that reasonably balanced working hours and reasonable leisure, with adequate wage scales, are the very heart of universal use and buying which maintains industries themselves. In the working hours of that early day the automobile would have lacked a market, not alone for wage scales which had no margin for the purchase of such a modern-day convenience, but a working day which had no time to use or enjoy such a facility, and a working day that left little strength or energy except for bed or dissipation. As early as 1860 we had gasoline, but it was worthless, for inventions had as yet found no way to use it.

Strong Men of the Day

The pioneer industry of that day had its strong men whose names and achievements are grafted into American history. The columns teem with the names of Huntington, Harriman, Rockefeller, Carnegie, Morgan, Clark, Armour, Hill, Gould, Fiske and Cooke. The field in which these financiers laid the foundation for industrial leadership and large individual fortune was *small indeed.* The Stock Exchange recorded a turnover of 100,000 to 200,000 shares a day, against today's 5,000,000. The financial columns showed these men and others possessed of large vision and supreme daring. There run the tales of large risks assumed, success in industry development, paralleled with gigantic losses, under the standards of that time.

These straws illustrate the way in which social custom and modern industry have, step by step, developed together the earning power which has widened the range of articles of use and convenience in common possession, and have created leisure to enjoy and demand more things in everyday living. From the beginning invention has been the life-blood of suggestion, creating new articles of universal aspiration.

America was still a pioneer country with resources yet to be developed, with latent wealth still awaiting the mind and hand that could fashion it to human service. Remember that Edison's electric light was only three years behind the year of the last great tragedy of America's receding frontier in the Indian country; 1876 was the year of Custer's Last Stand, the final tragic resistance of the red Indian to the oncoming wave of American settlement. It still comes as a shock to most of us that the lives of many of this audience have spanned the period between the Indian frontier and today's complex civilization. Measured in changes of customs and habits, measured in the expansion of old industry with the miracle growth of population and buying power, measured in the rôle of new inventive industry which those early days could not even imagine, this period of fifty years stretches interminably in the imagination.

The Long Record of Time

But in the long record of Time itself, how short the span, indeed! I remember recently hearing this perspective illustrated by Charles F. Kettering, himself an inventor of international eminence. He recalled that last year Roy Chapman Andrews found in the Desert of Gobi, the heart of Asia, a great dinosaur skeleton, and the geologists looking over the strata in which it was found estimated that it had been there eighty million years—quite a long time. So they said, "It is petrified and nothing of any vitality could be existing for eighty million years." "But," added Kettering, "Harvard University had an astronomical laboratory down in Africa, and last year they photographed a nebula —a spiral nebula—and the light that affected the photographic plate in that camera last summer left its source one hundred million years ago. Light travels at the rate of 186,000 miles per second, and if you reduce 100,000,000 years to seconds and multiply the result by 186,000 miles, you have the distance in statute miles. In other words that light which affected that photographic plate last summer left its source twenty million years before the dinosaur was born."

Then Kettering goes on to point out that the human race has been conscious of itself only eight thousand years. If you could take the eight thousand years in which this human race has been conscious of itself and put it into that 100,000,000 years and stir it up and turn it over to a chemist to analyze, he would analyze that thing and report, "That looks to me like pure Time, with the exception of just a slight trace of impurity in it which we call Civilization." If you would take the two thousand years of the Christian Era and dissolve it in that 100,000,000 years, the scientist could not find even a trace of it.

The Deathless Quality of Mind

There is just one quality which man possesses which is deathless in itself and which makes the race able to look even pure Time in the face with self-respect. That is the deathless quality of Mind, the divine restlessness of intellect which explores the unchanging mysteries of Nature itself. It is the faculty which enables man to comprehend natural law and harness under that law the forces of Nature to man's service. Somewhere back in the misty days of our early race, the element of fire having been discovered by accident, there was mentality enough for the race to see that light and heat were associated by natural law together. There are today the evidences that the early cave man chipped niches in the rock walls of ancient caverns in which fire was evidently built for lighting only. Then rushes were used, soaked with grease, and splinters of resinous woods like pine; then the rush-light style of lamps in which wicks soaked up oils from an open dish. Then before the Christian Era, through centuries of experimentation, wax candles had been made from pressed honeycomb, and then the tallow candle followed. Oil lamps originated with sperm oil from the whale fisheries a century and a half after the landing at Plymouth Rock. Then some Edison of a century and a half ago developed the metal chimney which steadied the flame of an open lamp, and then came the glass chimney which made the oil lamp really practicable. Then man's intellect comprehended the possibility of controlling illuminating gas for lighting, and so good a mind as Napoleon's condemned the whole effort to substitute gas in the place of candles as a "grand folly." Sir Walter Scott ridiculed the "mad man" who proposed to light the streets of London with smoke. It was difficult in the early days to get lamp-lighters to approach the gas posts for street illumination to light the gas.

Obstacles to Progress

Less than one hundred years ago the Philadelphia Common Council received a petition against the use of gas, stating its "immense destruction of property was nearly as fatal as gunpowder."

Always the pioneers of science have had to overcome not only the mysteries of natural law, but to overcome the inertia and opposition of human intellects slower than their own. Curiously enough, too, the study of invention progress shows that invention is rarely the inspiration of a moment, but more largely the laborious product of toilsome study and experimentation. The natural law by which heat and light are inseparable, which was recognized by the caveman who built his little fire in the rocky niche to give him light, was the law which enlisted the painstaking study of Edison to find a practical light that could be carried into every nook and corner. Recognizing that light was inseparable from heat, his early experimentation was toward finding a substance so high in melting point that the heat of a current producing light would not destroy the substance itself. This early suggested carbon. It would be stimulating to the active minds of today that dread the slow, laborious process of observation to read the history of the numerous experiments of Edison to find a practicable carbon for the use of lighting. He sent explorers at great expense, over all the world for fibers. The charring of various materials runs through the whole gamut, from tissue paper, through all kinds of thread, lime, celluloid, shavings and cork; and in those early days bamboo fibers gave the best results. Learning that carbon burns in the air, his early lamps were exhausted of air by a hand-pump. It required the inventor's tenacity of purpose to carry through the early obstacles to the success which we celebrate tonight. That nature marked him early for special distinction in this field is indicated by the fact that he experimented with chemicals in his father's cellar at the age of eleven, and at fifteen possessed important books on chemistry and physics, and carried his own experimental apparatus in the baggage car on the train on which he worked as newsboy, between Port Huron and Detroit. Something divine and deathless drove him into this field in which, measured in terms of human service, he has a supreme distinction.

What Does It Profit?

We have today bewildered minds that stand by the wayside and call for the return of the good old days before machine civilization. "What does it profit a race," they say, "if living is made soft and easy, and thereby sturdy character is undermined?" "The new security of livelihood must lead to relaxed effort, to lowered standards." "What is the contribution to human welfare that we pile our great temple of industry story on story, reaching high heaven itself?" "What does it mean other than gross materialism that we invent the radio?" they say. Does it mean nothing to them that the intrepid explorers of the Polar South hold daily contact with civilization through this mysterious triumph of invention? Does this daily contact which includes even the programs of music and lighthearted entertainment from the cities they have left behind undermine the fiber of men who dare the mysterious hazards of the Arctic wastes? Do our 25,000,000 automobiles which have made the open road also the open door to health and to family picnics that replace the corner saloon, mean nothing to them except a supposed decadence of individual character? Does the miracle of the motion picture, seating its daily audience of 14,000,000 and bringing to them through eye and ear the daily news of a now contracting world, mean nothing to them in quickened intelligence, wider understanding, and the inspiration of limitless opportunity? Does the new invention of the airplane which makes every interior city a potential world port, spell to them an undermining of the qualities of personal daring and courage? Does it mean nothing to them that modern industry, developing under the profit motive, to be sure, has nevertheless made a direct contribution toward elimination of sickness and suffering, and even held death itself at bay for longer spaces?

For example, the modern refrigerator, the perfected metal and glass containers for perfectly preserved foods, the vacuum cleaner with its daily cleanliness, the automatic heater with its equably preserved temperatures of the home—these are the things, along with advances in professional knowledge, that vanquish countless human tragedies. This is illustrated by the fall in the death rate of the United States from 17 per 1000, the average of twenty years ago, to 12 per 1000, the average of these recent years. That means 600,000 less deaths per year than twenty years ago. Resolve that, if you please, into the countless homes that are thus protected against individual sorrow and desolation. Should inventive industry and the trained professional mind take no pride in 600,000 fewer death tragedies in American homes each year?

No Fear for the Sturdy Virtues

And to illustrate to you the intimate interlacing of social service and industry itself, this fall in the rate of deaths, clearly the product of improved hygiene and sanitation, is itself the basis of a universal confidence in life insurance which has directly stimulated the virtues of thrift and self-denial. The unexpected savings to these life insurance companies by a rate of death loss less than had been expected when they made their contracts years ago, constantly falling, has enlarged their resources and created a confidence in these companies, along with the lengthening record of able and trustworthy management, until our people have contracted with these private companies a total of seventy-three billion dollars of life insurance. In half the span of time which we celebrate tonight the thrift investment of our people in this after-death protection has risen from ten billion to seventy-three billion dollars. Here are private contracts many times the aggregate of all the allied debts and reparations, which through four months of negotiation for their final plan of settlement has fixed the attention of the world, although these debts and reparations rest primarily upon the entire national wealth of several great peoples. Besides these life insurance contracts which are based on the impulse of saving and the affectionate care of those who survive us, marches also the record of extraordinary growth in savings accounts. These are the indicators that dissipate any reasonable fear that easier living conditions will undermine the sturdy virtues of thrift and self-denial and affection and lead only to extravagance and thoughtless waste.

Could you imagine an Edison under any condition of modern living that would not devote his restless intellectual energy to the study of natural laws and the perfection of inventions of human service? And there are many coming Edisons of smaller stature.

Can you imagine a field of inspirational appeal that can exceed the field of modern business, ranging through invention, research and organization, when that business is conducted with high ideals as well as high standard of business efficiency?

The New Freedom

Is our civilization highly mechanized, or are we beginning for the first time in history to put a proper premium on the superiority of mind over muscle? When we equip office and workshop with invention and power that shorten the working day, has modern industry only contributed an opportunity for profitless idleness or worse? When electrical servants in the home free the afternoon of its ancient tasks, has industry done nothing more than swell the motion-picture audience or added to the window shoppers of our avenues? There is no chorus from the emancipated homes of America that the home is being mechanized, destroying the craftsmanship of former times. There is no insistence from the women of America that we return to the domestic era of the washtub, the stifling range and the dusty broom. Twenty million American homes connected for electricity evidence no inappeasable aspiration for the days of the kerosene lamp. American homes pay for kilowatt-hours, but they buy light, warmth, coolness, relief from drudgery.

So also 500,000 farms now connected with electric light and energy, are developing a new definition for the farm unit—a departure from the traditional farmstead, but a farm in which the energy of the factory will be applied to the lightening of farm drudgery as well. Modern industry and particularly the power industry has presented to all of us the priceless gift of leisure hours. Industry does not need to assume the personal responsibility for the use of those precious moments of opportunity. That responsibility rests on the individual. If we believe in democracy at all, if we trust human character at all, we must profoundly believe that, through error and misdirection, man will nevertheless learn to use this new freedom wisely.

The Basis of Social Advancement

With profound truth, Herbert Hoover said in 1924, before the World Power Conference:

"The factor that has been primarily responsible for the tremendous changes of the last century and without which modern civilization could not exist is mechanical power. The form in which in increasing degree such power is being applied is electrical energy—the greatest tool that has ever come into the hands of man. The degree to which we utilize this tool as a substitute for manual labor will largely determine the rate of our industrial and social progress. To reduce human labor, to increase its productivity, is the most profound basis of social advancement."

Within the past month the Committee on Recent Economic Changes, under the chairmanship also of Herbert Hoover, recounts the progress of the five intervening years. This report speaks of the rise in the use of power, three and three-quarter times faster than the growth in population. It emphasizes its increasing flexibility which enables it to penetrate every section of the United States, including rural areas. It speaks of the silent revolution by which through power the unskilled worker has become a skilled operator, multiplying his effectiveness. The survey states that, as a nation we now use as much electrical energy as all the rest of the world combined.

Inevitably we must analyze for ourselves the causes which lie behind pre-eminence in national progress. There is, then, not disparagement, but inspiration, for ourselves and others, when we find cause and effect securely jointed.

For example, the 60,000,000 h.p. today in America is possible because today 75 per cent of America's factories are electrified, while in Great Britain only 48 per cent are electrified. With that we find that the relative national wealth of the United States and Great Britain runs in exact ratio of the horsepower per capita used in industry, namely, 4½ to 1. With that, again, we find as between the United States and Great Britain we have twice as many owned homes, and one-twentieth as many people per capita on public charity.

Distribution of Wealth

The indicators by which our national income rises in throbbing growth until it approaches an annual one hundred billion dollars of new production, show that American industry, with its power service, increases the volume of things to divide among the homes of America. The evidence in America of equable distribution of these earnings under our political and social system rests on such indicators as its 25,000,000 automobiles and its 19,000,000 telephones. Distinctly, the average of human security is steadily advancing. The congested quarters of our cities today show the universal possession of good shoes and stockings by the children of the tenement. The wage-earner of America today may reasonably aspire to own his flivver and a savings account. The working-girl of America has established the standard of silk as the proper garb for self-supporting womanhood. The poorhouse is today echoing fewer footsteps within its sparsely tenanted halls.

History will rate America's most significant gift to civilization as its genius for revolutionary organization of industry. America's title of honor in history will rest upon the rise of average welfare under the earnings of highly organized and power-driven industry, and of a social system which distributes and shares those earnings fairly.

But, then, industry must not rest content with the progress which has been made. As long as there are still in the world men and women and children who would be happier if there were brought within their reach more and better food, more and better clothing, and until security of employment and earning power enables them to live in better homes, there is a responsibility and inspiration in this power industry which is the direct servant of all industry. All human history has accepted the concept of poverty as unavoidable. "The poor ye have with you always," has scriptural authority. Under the favor of Providence, America may reasonably hope, in the not distant future, it will have shown that poverty—except as result of individual and exceptional misfortune—may be recorded as a vanquished evil. When that day comes it will rest upon the economic law established by modern industry, directed by brains, driven by power, administered with high intelligence and high ideals. There is a peculiar responsibility resting on this electrical industry. It asks from public regulation, fair and generous treatment and understanding, and it

(*Continued on page 428*)

Amplifier Considers Industrial Migration

By AMPLIFIER

THE other day a good friend of mine, whose name is known to every executive of every central station in the country, handed me a large and somewhat heavy manilla envelope, saying: "Here are some galley proofs of a special report which I would like to have you look over and tell me what you think of the story. Arriving home, I opened it up, only to be greeted with the words INDUSTRIAL DEVELOPMENT IN THE UNITED STATES AND CANADA at the top of the first galley.

Almost at once I was enveloped in an atmosphere of deep gloom. It settled down like one of those blanketing London fogs which always happen along when you have missed your boat and have to spend Thanksgiving Day in England. I looked up at a bookcase near my desk only to see a long row of depressing volumes bound in that dingy red which seems to be a favorite color of the United States Printing Office, and labeled "Thirteenth Census of the United States." Volumes 8, 9 and 10 bear the subtitle "Manufacturers."

NO doubt there is a splendid reason for the immortalization of the enormous amount of statistical data entombed in those volumes, and I suppose that there are a lot of folks who resurrect them periodically and use them to good advantage, but why anyone should write a piece entitled "Industrial Development in the United States and Canada" to the extent of some 75 or 100 galleys and why it should be handed to me to read on a hot summer night was, for the moment, beyond my comprehension.

Glancing over these proofs in a gingerly fashion, I began to get interested. Here was something new. This was not a census bureau story filled with endless tables of statistics and graphs depicting the history of this or that industry during the past ten years. Almost immediately I found that it was a story of American and Canadian communities—why old industries moved from here to there and why new industries select particular locations in which to establish themselves. Having read it through, I can, without the slightest hesitation, commend it to careful consideration of every city official, every chamber of commerce, every luncheon club and every booster organization in the United States. It will tell them many things not dreamed of by the average citizen interested in the growth of his home town whether it be a great metropolitan center or a small inland community.

As nearly as I can make out, the Civic Development Committee of the National Electric Light Association set out to find what makes some communities progress industrially while others either stand still or go backward, and almost immediately found that no comprehensive reliable data was available from any source; enough to discourage any committee. This outfit, however, turned to the Metropolitan Life Insurance Company with the knowledge, according to a letter from P. S. Arkwright to James L. Madden, third vice-president of the Metropolitan, "that your company had made very extensive investigations in such matters and that your facilities for collecting and classifying such economic data were extremely well organized, at the same time assuring you of the cooperation of the Association (N. E. L. A.). We also recognized the fact that the nation-wide interest of your company placed you in a position to make a fair and unbiased investigation of such a subject, without which, such an investigation might not be inclusive or receive general confidence."

APPARENTLY the idea appealed to Mr. Madden and the Metropolitan Company. At least their interest was sufficient to produce a remarkable document on what some people might call "The Migration of Industry," but which, because there is so little migration in it, I would call "The Location and Relocation of Industrial Establishments and Why" as more descriptive. It covers a survey of 2084 communities in the United States and Canada comprising 75 per cent of the urban population of this country and about two-thirds of the urban population of our Northern neighbor. It is based on information obtained from chambers of commerce, public utility companies, railroads, banks and miscellaneous sources, including mayors of cities, postmasters, real estate companies and other contacts. To check the information received from these sources, a letter was written to every industrial establishment mentioned. In fact, the whole job was done with all of the thoroughness of the Metropolitan in writing a new life insurance policy or paying a loss on an old one.

The most striking thing about this report which, to use a somewhat hackneyed phrase, "sticks out like a sore thumb," is the established fact that there isn't so much to this so-called "migration of industry" as some people seem to think. Industry is not picking itself up annually and moving around the country like a tenant trying to beat his landlord out of the rent. During the two-year period covered by the survey (1927-1928) 1934 communities in the United States gained 10,267 plants employing 371,334 workers. Of this number no less than 8400 establishments were brand new industries established within the communities. Only 964 represented plants moving from one city to another, while 903 were branches of existing industries.

THE next striking thing about the information obtained is that while these 1934 American communities gained 10,267 new industrial establishments during the two year period they lost, in that time, 5908 plants. Of this number 1047 moved away and 4861 went out of business. It would seem that chambers of commerce, anxious to see their communities progress industrially, might equally as well turn their attention to the reasons why establishments move away or go out of business. Personally, it seems to me that a community should take care of what it has before reaching out for something belonging to some other community and, getting it, find that it has done so only at the expense of the home industry which is already established. The banks, the public utilities and the business interests of any city have a distinct obligation to existing business enterprises which must precede any obligation to a program of expansion.

A third interesting feature established by the survey is the fact that offers of bonuses, free land, free buildings and free taxes apparently play little or no part in the reasons given for the location of plants. After all, no business can survive and prosper on subsidies alone, and the replies to the questionnaire sent out show very clearly that this sort of thing either received no consideration, or so little consideration that it can be said to be negligible as a factor in the development of any community.

What, then, are the factors most commonly influencing the selection of a particular site for a plant? Without doubt a plentiful supply of dependable cheap power is of the greatest importance. Yet, because the prevalence of cheap electric power almost anywhere in the United States where there are anything resembling markets for industrial products is so well known it has become commonplace. In the ranking of reasons for the United States as a whole, power is given seventh position in the answers received from the reporting communities. It is a well-known fact that today there is not a single community in the country of 1000 population or over without electric service, and the manufacturer, seeking a home for his business, brushes the question of power aside as a question he need not ask knowing that if other conditions necessary to a successful undertaking exist the power must be there.

Outstanding reasons given for the selection of sites were transportation, labor and markets. "In many instances," says the report, "there was evidence of a close relationship existing between the factors of transportation and markets. As might be inferred, these do not represent distinct reasons, but are, rather, different aspects of the same thing, i.e., ability to serve markets. Thus, this factor and favorable labor conditions were the outstanding reasons determining the selection of a plant site."

SUMMARIZING the establishment of industries in relation to size of cities, the bulk of the gains seem to go to the large cities. This is principally due to the large number of "satellite" industries, classified in the survey as new industries, starting up in the larger cities around established industries. An analysis of the distribution of plants by three classifications shows that one-half the relocations, one-half the branches, and over three-fourths of the new industries were established in cities of over 50,000 population. However, the greater part of the movement out of cities and of the firms going out of business was reported from the larger cities. Two-thirds of the plants which moved away and more than four-fifths of the plants going out of business were reported by cities of 50,000 population or over.

Approaching the subject from the standpoint of "trends of industrial movement," it was found that the textile industry accounts for 25 per cent of the relocation. The machinery group accounted for 15 per cent, the iron and steel group for 8 per cent, the lumber group 8 per cent, and the leather group 7 per cent. Of the 8401 new industries reported, considerably more than one-half were in the Middle Atlantic States. Of the total number, the textile group accounted for 22 per cent, the paper and printing group for 10 per cent, the food group 9 per cent, the lumber group 7 per cent and the leather group 6 per cent. In the miscellaneous group were reported 1,190 plants, of which 700 were in the fur industry in New York.

In the above I have made no effort to review the report of this survey in detail—I have tried only to indicate its great value by pointing out some of the important features which indicate the trend of industrial movement. The data gathered is analyzed geographically, by industries, by numbers of employees gained or lost and by sizes of communities. It should be of decidedly more than passing interest to every business man who depends for an increase in his prosperity on an increase in the prosperity of his city or town.

If the report did nothing else, the fact that it indicates the need for some permanent machinery to carry on such a survey from year to year would be sufficient to justify it. There is no such machinery at present. It has been suggested that the U. S. Department of Commerce might very well consider taking on this work as part of its regular function of serving American industry. It is to be hoped that this suggestion will receive serious consideration on the part of the proper authorities.

Common Sense and Electricity

Safety Rules for the User of Electricity

THE Accident Prevention Committee has prepared for the use of member companies ten common sense rules designed to answer the more important questions arising in the householder's mind with respect to the proper handling of things electrical on his premises. These rules have been reproduced in pamphlet form by the Association.

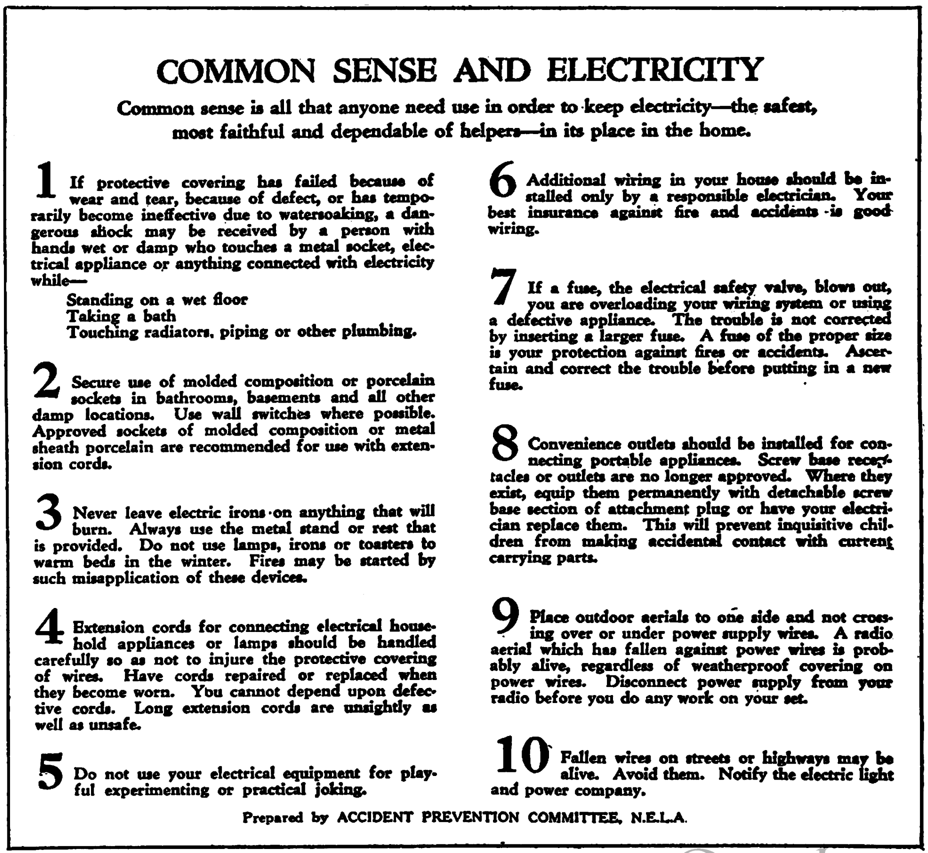
The inside pages of this pamphlet are reproduced herewith. Space is left on back cover page for local company imprint or message. The pamphlet folds to fit ordinary envelopes. A considerable number of companies have ordered stocks for distribution to all consumers with bills.

While many companies may wish to provide their own printings of these rules, N. E. L. A. Headquarters will accept orders at the following rates:

Less than ten thousand, $7.50 per thousand.

Ten to twenty thousand, $6.00 per thousand.

Special prices for larger quantities.



COMMON SENSE AND ELECTRICITY

Common sense is all that anyone need use in order to keep electricity—the safest, most faithful and dependable of helpers—in its place in the home.

1 If protective covering has failed because of wear and tear, because of defect, or has temporarily become ineffective due to watersoaking, a dangerous shock may be received by a person with hands wet or damp who touches a metal socket, electrical appliance or anything connected with electricity while—

Standing on a wet floor
Taking a bath
Touching radiators, piping or other plumbing.

2 Secure use of molded composition or porcelain sockets in bathrooms, basements and all other damp locations. Use wall switches where possible. Approved sockets of molded composition or metal sheath porcelain are recommended for use with extension cords.

3 Never leave electric irons on anything that will burn. Always use the metal stand or rest that is provided. Do not use lamps, irons or toasters to warm beds in the winter. Fires may be started by such misapplication of these devices.

4 Extension cords for connecting electrical household appliances or lamps should be handled carefully so as not to injure the protective covering of wires. Have cords repaired or replaced when they become worn. You cannot depend upon defective cords. Long extension cords are unsightly as well as unsafe.

5 Do not use your electrical equipment for playful experimenting or practical joking.

6 Additional wiring in your house should be installed only by a responsible electrician. Your best insurance against fire and accidents is good wiring.

7 If a fuse, the electrical safety valve, blows out, you are overloading your wiring system or using a defective appliance. The trouble is not corrected by inserting a larger fuse. A fuse of the proper size is your protection against fires or accidents. Ascertain and correct the trouble before putting in a new fuse.

8 Convenience outlets should be installed for connecting portable appliances. Screw base receptacles or outlets are no longer approved. Where they exist, equip them permanently with detachable screw base section of attachment plug or have your electrician replace them. This will prevent inquisitive children from making accidental contact with current carrying parts.

9 Place outdoor aerials to one side and not crossing over or under power supply wires. A radio aerial which has fallen against power wires is probably alive, regardless of weatherproof covering on power wires. Disconnect power supply from your radio before you do any work on your set.

10 Fallen wires on streets or highways may be alive. Avoid them. Notify the electric light and power company.

Prepared by ACCIDENT PREVENTION COMMITTEE, N.E.L.A.

Behind the Veil

*The First Civilized American**

By ERNEST GREENWOOD

The fourth of a series of articles portraying, against a social historic background, the evolution of the electrical industry and the chief personalities that have been instrumental in its growth.

THE PATH of the historian is surely a difficult one, full of pitfalls, dangerous curves, sand traps and a great variety of obstacles, designed to leave him, at the end of his journey, mentally foot-sort and weary—wondering, perchance, if the establishment of records for present or future generations is worth the doing thereof. Like the bibliographer, he must realize sooner or later that "of the making of books there is no end," and that, while history itself may have a beginning which is finite in date, the incidents which he attempts to record chronologically as the beginnings of new eras are little more than milestones reminding him that men may have been thinking the same thoughts and erecting similar milestones hundreds, or even thousands, of years before.

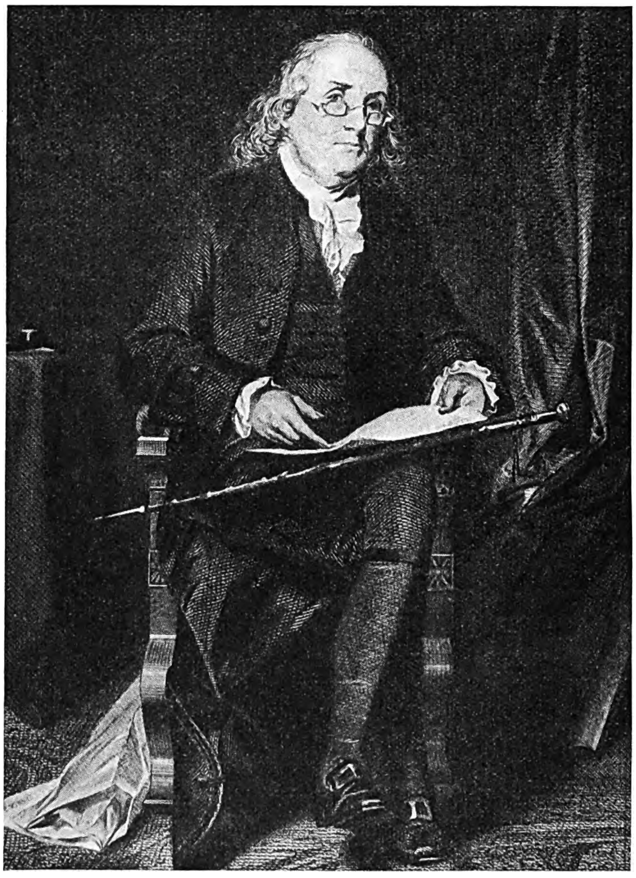
I had thought, when I finished the preceding installment of this series with a description of the experiments of Von Guericke, that, after duly noting the work of Francis Hauksbee, Stephen Grey, Charles du Fay and Bishop von Kleist, who discovered the principle of the Leyden jar (?), I could jump at once to our own Benjamin Franklin who, to quote the N. E. L. A. Handbook, "made the immortal discovery with his silken kite that lightning and the artificial discharge from the Leyden jar are identical." I even had some idea that I was going to be able to say with Humboldt (Cosmos, Vol. II, page 727) that "from this period the electric process passes from the domain of speculative physics into that of cosmical contemplation—from the recesses of the study to the freedom of nature." I must insist that that phrase is a most erudite summing up and one of which any historian might well be proud, even though borrowed from a predecessor.

But I find I cannot do so if I am to maintain the integrity of this account. The good Benjamin may have established the identity of electricity and lightning by an experiment which has appealed to the dramatic instincts of succeeding generations, but he was by no means the first to have such an idea or to think of the possibility of "lightning rods" as a protection against this strange and little understood force of nature. Moses, born more than 3300 years before Franklin, is supposed to have had some knowledge of the phenomena of electricity. Michaelis remarks that "there is no indication that lightning ever struck the Temple of Jerusalem during a thousand years; that, according to Josephus, a forest of points, gold and very sharp, covered the roof of the temple, and that this roof communicated with the caverns in the hill by means of pipes in connection with the gilding which covered all the exterior of the building, in consequence of which the points would act as conductors."

The roof of King Solomon's Temple has numerous points distributed over it which "effectively served as lightning conductors." The Etruscans (about 600 B.C.) are said to have attracted lightning by shooting arrows of metal into clouds which threatened thunder. Pliny asserts that they had a secret method of not only "drawing it down" from the clouds but of afterwards "turning it aside" in any desired direction.

Tradition says that "Numa Pompilius, the second king of Rome, was initiated by the priests of the Etruscan divinities and instructed by them in the secret of forcing Jupiter, the Thunderer, to descend upon earth." Salverte believed that "before Franklin discovered his refined electricity. Numa had experimented with it most successfully, and that Tullus Hostilius, the successor of Numa, was the first victim of the dangerous 'heavenly guest' recorded in history." Salverte also asserts that in the days of Ctesias (Ktesias) India was acquainted with the use of conductors of lightning.

So to say that Franklin established the identity of electricity and lightning, and that he invented the lightning rod, is like saying that Thales invented electrical attraction, that Leonardo invented the principle of the present day airplane, that Edison "invented" the principle of the incandescent lamp, or that Sidney Z. Mitchell "invented" the financial principles on which holding and management companies are based. What he did do, however, was to recognize something which had been a matter of speculation for centuries and then demonstrate, for all time, the truth of this speculation, which was that lightning and electricity are identical; out



Painted by Alonzo Chappell. *Engraved by T. Phillibrown.*

BENJAMIN FRANKLIN

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* The author thanks Mr. Phillips Russell who, in his biography of Benjamin Franklin, designated him as "The First Civilized American."

of his demonstration the world obtained the first *practical* results of electrical experimentation.

Before any more time is devoted to Franklin, however, there are certain historical threads which must be caught up and woven into the fabric of this account if our tapestry is not to have a rather moth-eaten appearance at that section, supposed to represent the period between Gilbert and the philosopher of Philadelphia. Some time after Von Guericke's discovery that electricity could be transmitted (1705 to be exact), an Englishman by the name of Francis Hauksbee constructed a powerful electrical machine wherein the Von Guericke sulphur globe was replaced by one of glass. With it he found "upon exhausting the air, whirling the globe rapidly and placing his hand upon the outside, a strong light appeared upon the interior, and that the light would show itself also upon the outside when air was let into the globe." Here again we find a man given credit for doing something which had been done years before. In 1675 Sir Isaac Newton had not only done exactly the same thing, but in a measure (as shown by his correspondence) anticipated Franklin's discovery of the identity of lightning with electricity.

IT was left for Dr. William Well, a prominent English divine, to definitely establish the resemblance of electricity to thunder and lightning insofar as comparative modern literature on the subject is concerned. In 1708 he reported to the Royal Society the results of certain experiments consisting of rubbing a large bar of amber against woolen cloths. He stated that "a prodigious number of little cracklings was heard, every one of which produced a small flash of light; and that when the amber was drawn lightly through the cloth it produced a spark but not crackling," and also observed that "by holding a finger at a little distance from the amber a crackling is produced, with a great flash of light succeeding it, and, what is very surprising, on its eruption it strikes the finger very sensibly, wheresoever applied, with a push or puff like wind. The crackling is fully as loud as that of charcoal on fire. . . . This light and crackling seem in some degree to represent thunder and lightning."

While Von Guericke established the principle that electricity could be transmitted, it seems, so far as I am able to find out, that Stephen Grey, a fellow of the Royal Society, should receive the credit for the investigations which finally led to the discovery of the principle of electric conduction and insulation as well as to the fact—not the principle—of induction. According to Mottelay, he "laid the foundation of electricity as a science." He proved that electricity can be excited by the friction of feathers, hair, linen, paper, silk, etc., all of which attract light bodies even at a distance of 8 or 10 inches. He next discovered that electricity can be communicated from excited bodies to bodies incapable of ready excitation. When first suspending a hempen line with pack threads, he could not transmit electricity, but when suspending the line with silken threads he transmitted the electrical influence several hundred feet."

The idea of suspending his "line" with silken threads he obtained from his friend Granville Wheeler (not Checler, as some historians have it). Wheeler thought that silk would be much better than pack thread because it was smaller and less of the "virtue" (electricity) would probably pass off. By June, 1729, Grey and Wheeler succeeded in passing electricity through pack thread supported by silken cords a distance of 765 feet and through a wire a distance of more than 800 feet. In 1726, however, three years before this, John Wood, an English architect, is said to have shown that electricity could be conveyed "through wires a long distance," and in 1747 William Watson applying Wood's discoveries extended his experiments over a distance of four miles, a circuit of two miles of wire and two miles of ground.

THE year 1745 was to witness a discovery which Professor Tyndall says "throws all former ones in the shade" and which Dr. Priestly calls "the most surprising yet made in the business of electricity." This was the invention of the Leyden jar, or rather the discovery that electric power could be accumulated in a glass phial.

Just who invented the Leyden jar will probably never be decided. The N. E. L. A. Handbook credits it to Bishop von Kleist, dean of the Cathedral of Comin, Pomerania, but the invention is also claimed for Pieter Musschenbroek, the celebrated professor, and also for Cunæus, a rich burgess of Leyden. Mottelay says that the discovery was first announced "in a letter *to* von Kleist dated the 4th of November, 1745, and addressed to Dr. Lieberkuhn, who communicated it to the Berlin Academy." I think this is a typographical error, and that Mottelay meant to say it was communicated in a letter *from* von Kleist, for the evidence is that he was the first to publish the discovery. However, his explanations were most obscure, and not only Dr. Lieberkuhn but various other scientists to whom von Kleist wrote all returned word that the experiment did not succeed with them. The Abbe Nollet in a letter to Samuel Wolfe, dated March 9, 1946, says that "the experiment at Leyden was upon principles similar to that made with a phial half full of water and a nail dipped in it; and that this discovery would have been called the Danzig experiment if it had not happened to have got the name of that of Leyden."

About this time Dr. William Watson—a most distinguished name in this period of the history of electricity—like most scientists at that time made numerous experiments with the Leyden jar and is said to be the first to observe the flash of light attending its discharge. He, himself, says: "When the phial is well electrified and you apply your hand thereto, you see the fire flash from the outside of the glass wherever you touch it, and it crackles in your hand." He directed a series of experiments which eventually proved "the instantaneous transmission of the fluid." Regarding these experiments, Professor Musschenbroek wrote to Dr. Watson, *"Magnificentissimis tuis experimentis superasti conatus omnium."*

All of which brings us up once more to our own Benjamin Franklin because, as Mottelay tells us, Watson's experiments were repeated, "notably by Franklin" at Philadelphia in 1748. Benjamin first began thinking about electricity in 1745, but it is not until 1752 that we find any record of his own of the famous kite experiment which proved a fact that had been pointed out by many scientists before him.

AS a caption for this chapter I have written "The First Civilized American." I admit that I borrowed the phrase from Phillips Russell, but that doesn't make it any the less apt. Just what were the affairs of the world when Franklin was born? Was it the end of the fourth act or the beginning of the fifth in the drama of civilization? Let us see.

In 1706, the year of Franklin's birth, Queen Anne was sitting on the throne of England. During that year Daniel Defoe published in London his *Juno Divino*. It bore this significant dedication: "To the most Serene, most Invincible, and most Illustrious Lady, REASON." This, as a matter of fact, was the keynote of the Eighteenth Century, when "it was firmly believed that henceforth Reason was to govern all human emotions." Men in those days might still flatter monarchs just as men today flatter presidents, but in their hearts they were questioning the divine right of kings just as we question today the divine right of bureaucrats in Washington. Sixteen years before Franklin was born, John Locke had published his "Essay on Human Understanding," and while the young Benjamin was cutting candle wicks in his father's shop the great Voltaire was serving a sentence in the Bastille for writings objectionable to the authorities. When he was only six years old, Jean Jacques Rousseau, who was to lay down the disturbing principle that all governments must be based on the consent of the governed, was born, while Frederick the Great, of Prussia, who taught the theory that a king is the first servant of the people, saw the light of day at about the same time. As Russell tells us "new forces, uncomfortable theories and undreamed of discoveries were making themselves felt. Newton had already established a novel science of theoretical mechanics; Watt was shortly to discover the steam engine; Spinoza had written a new philosophy in Holland, and the skeptical writings of Lord Shaftesbury and Anthony Collins were finding an ever-widening circle of readers. Men felt an uneasiness of the spirit without knowing its origin, for the flowers of authoritarian evil had not yet bloomed."

LONG afterward Henry Adams wrote, concerning this century: "Evidently a new variety of mind had appeared . . . not one considerable man of science dared face the stream of thought; and the whole number of those who acted, like Franklin, as electric conductors of the new forces from nature to men, down to the year 1800, did not exceed a few score, confined to a few towns in Western Europe. Asia refused to be touched by the stream, and America, except for Franklin, stood outside." What did Adams mean by saying that "America stood outside?" Suppose we turn again to Russell.

"At the time when the infant Franklin was uttering his first cry, the most conspicuous writer in the American colonies was the Rev. Cotton Mather. While teachers in other lands were urging men to listen to the voice of reason, he was calling on the faithful to beware of witches. Only a few years before Franklin's birth, the mischief set afoot by eight silly and illiterate Massachusetts girls, who used to meet and giggle hysterically in the dark of the moon, had reached a maniacal climax, in the Salem witch persecution of 1692. Cotton's father, Increase Mather, and Solomon Stoddart were meantime issuing pamphlets of quarrelsome theology dealing with such questions as these:

"Is it lawful to wear long hair?"

"At what time of evening does the Sabbath begin?"

"Can baptized persons destitute of religion come to the table of the Lord?"

"The ten American colonies, containing less than half a million inhabitants all told, were perched timidly on the rim of the Atlantic Ocean, the shore of which was the nearest thing to England. Loosely strung settlements hung southward from Boston, divided from each other by vast tracts of lonely land traversed at intervals by dim trails and gully-washed roads. Boston, with 10,000 inhabitants, regarded itself as a bustling city, but near the Old South Church still stood the village pillory and stocks. Probably nowhere in New England did men or women go to bed at night with minds at ease, for the shadows cast by the Indian-haunted forests on sparsely yielding fields were deepened by that which overhung the spirits of the people. The Mathers and their kind, disagreeing with St. John, taught by precept and example that God was Fear. Fears huddled in the corners of human hearts, and toil and uneasiness imparted that grimness to the human countenance which is pathetically evident in early American portraits."

The early life of Franklin is too well known to receive but scant attention here. He did not do particularly well in school and was antagonistic toward his father's beliefs and leanings. Woodrow Wilson has said that he was half peasant and half man of the world. He spent the whole of his leisure time among books and at one time decided to be a poet; his father, however, believing that verse-makers are "generally beggars," insisted that he "stick to business," and, as Benjamin wrote at the age of 65, "I escaped being a poet, most probably a very bad one."

WHEN Franklin was 15 years old, his brother James started a newspaper, the *New England Courant,* which was actually the fourth newspaper to be established in America, although Franklin, in his autobiography, speaks of it as the second. The two Franklin boys managed to produce a sheet which was denounced by the very Rev. Cotton Mather as "full freighted with nonsense, unmanliness, raillery, profaneness, immorality, arrogance, calumnies, lies, contradictions and what not all tending to quarrels and divisions and to debauch and corrupt the minds and manners of New England." Brushing aside the quaint phraseology of that day there is something strangely familiar about the charge. Certain types of politicians today have said something of this sort about news stories and editorials which are not to their liking.

Eventually the *New England Courant* was suppressed by the authorities with an order forbidding James Franklin "to print or publish the *New England Courant,* or any other pamphlet or paper of the like nature, except it be first supervised by the Secretary of this Province." The psychology of many of our present-day lawmakers seems to have a well established historical background.

There is no doubt but what Franklin belonged to that little group which possessed a "new variety of mind." He had but little religion and did about as he pleased, for, as he remarked at one time in his life, "so convenient it is to be a reasonable creature, since it enables one to find or make a reason for everything one has a mind to do." He drifted from Boston to Philadelphia, then to London, then back again, until he finally became established as a solid citizen engaged in the printing business, but always reading, reading, reading.

FRANKLIN'S attention was first directed to electrical studies in 1745, by a letter from Peter Collinson, Fellow of the Royal Society of London, to the Literary Society of Philadelphia, and he first wrote on the subject to that gentleman on the 28th of July, 1747. This was followed by several other similar communications up to April 18, 1754, the whole of which comprise most of what subsequently appeared under the title "New Experiments and Observations on Electricity, Made at Philadelphia, in America, by Benjamin Franklin, LL.D. and F.R.S."

The kite experiment is well worth recording in Franklin's own language. In a letter dated Oct. 19, 1752, he says:

"Make a small cross of two light strips of cedar, the arms so long as to reach to the four corners of a large thin silk handkerchief when extended. Tie the corners of the handkerchief to the extremities of the cross, so you have the body of a kite which, being properly accommodated with a tail, loop and string, will rise in the air like those made of paper; but, this being made of silk, is fitter to bear the wet and wind of a thunder-gust without tearing. To the top of the upright stick of the cross is to be fixed a very sharp-pointed wire, rising a foot or more above the wood. In the end of the twine, next the hand, is to be held a silk ribbon, and where the silk and twine join a key may be fastened. This kite is to be raised when a thunder-gust appears to be coming on, and the person who holds the string must stand within a door or window, or under some cover, so that the silk ribbon may not be wet, and care must be taken that the twine does not touch the frame of the door or window. As soon as any of the thunder clouds come over the kite, the pointed wire will draw the electric fire from them, and the kite with all the twine will be electrified, and the loose filaments of the twine will stand out every way and be attracted by an approaching finger. And when the rain has wetted the kite so that it can conduct the electric fire freely, you will find it stream out plentifully from the key on the approach of your knuckle. At this key, the phial (Ley-

(*Continued on page 456*)

The Code Situation

Addresses made at the Chicago Conference of Company Code Representatives

RELATION OF CODES AND STANDARDS TO POWER SYSTEM ENGINEERING

By E. C. STONE

Chairman, Engineering National Section N. E. L. A.

EDITOR'S NOTE: The reader is referred to page 368 of the June N. E. L. A. BULLETIN for the addresses of Judge O. B. Ryon, Consulting Counsel of the National Board of Fire Underwriters, Irvin W. Day, Chairman of the Codes and Standards Committee, N. E. L. A., and Marshall E. Sampsell, Chairman of the Commercial National Section, N. E. L. A., made at the Chicago Conference on March 18 and 19. A general report of this meeting will be found on page 302 of the May BULLETIN.

CODES and standards are frequently grouped together, perhaps because in many cases they are treated in a similar manner. In fact, however, the two words have quite different meanings.

By definition a standard is a type, model or example for comparison. In practice any fixed quality or type of material or apparatus used in the power system, or any method or manner of grouping and applying materials and apparatus in the system for application in generation, transmission or utilization, or any specified method of design or construction, or practice or procedure, or set of rules and regulations governing them may be established as a standard by official edict or general consent and use. In general, adopted standards are based on long and broad experience in practice, through which a high degree of adaptability of the standard to its use has been established.

On the other hand, a code by definition is a system of rules and regulations. Hence it may be said that all codes should be standards, but not that all standards should be codes. In other words, codes constitute one of many classes of standards. At the moment, however, it is codes with which we wish to deal.

In the power industry codes of major interest are systems of rules and regulations which are compiled for the purpose of controlling the hazards to life and property involved in the generation, distribution and utilization of electrical energy, and are sponsored by interests outside of the power industry. Two of these codes are of major importance, the National Electrical Code covering interior wiring and sponsored by the National Fire Protection Association, and the National Electrical Safety Code covering electrical generation, transmission, and distribution plant, and sponsored by the United States Bureau of Standards. Normally both of these codes are established as national standards through the procedure and authority of the American Standards Association. The National Electrical Code, because of its sponsorship, is naturally concerned primarily with fire risks, but in recent years, in order to improve its availability as a complete standard for interior wiring, it has dealt to some extent with personal hazards associated with interior wiring. On the other hand, the National Electrical Safety Code is concerned primarily with life hazards. In the case of both codes, because of their sponsorship by interests outside the industry, we find ourselves constantly on the defensive in respect to what is to be included within the codes.

FROM time to time attempts have been made by other interests to compile and enforce other codes dealing with electrical hazards. The National Electric Light Association, however, desires to recognize only the two major codes above referred to in the electrical field.

The engineer's interest in codes and standards lies in the effect which they may have on the costs of design, construction, and operation of the plant for which he is responsible. Money expended for the reduction of hazards must bring about a real reduction commensurate with the amount spent. Hazards to property in general result in destruction by fire and storm, or interruptions to service, and are controlled more or less automatically by the cost of fire insurance and the requirements for continuity of electric service to customers. In other words, the costs of these risks may be determined quite definitely, so that the expenditures justified to reduce or eliminate them are measured.

Hazards to life, however, are more difficult of reasonable treatment because of the humanitarian sentiment involved and the intangibility of many of the costs resulting from accidents to persons. In addition to the direct costs of accidents, either to employees of power companies or to others, which result from damages, compensations, destruction of property, and loss of service caused by such accidents, there are the intangible costs created by the effect of accidents on the morale of the employees and on public opinion. It is probable that in this problem, as in many others, public opinion is the final barometer by which the standards are set. While it is true that the public has pretty generally made up its mind that human life is priceless so far as the responsibility of industrial and public utility corporations is concerned, it does not apply the principle to itself. The average man or woman takes risks about the home, on the street, in automobile driving, and so on, far greater than those risks which are considered proper in corporation activities. Furthermore, it is very evident that the public would be extremely quick to reflect its disapproval of unreasonable and costly provisions for safety, if such provisions resulted in materially higher cost of service, by a curtailment of its use of the products or service of such corporations. From these points of view some measure can be made of the public's attitude toward accident prevention.

In this connection, it is interesting to note the small proportion which electrical accidents bear to all accidents. In the booklet "Accident Facts," published by the National Safety Council, it is stated that during 1927 over an average population of 20,000,000, there were 50 fatal electrical accidents in the home out of a total of 2437 accidents of all kinds, of which 792 were from falls. The fatalities in the home from electricity in this section of the population were thus 1 per 400,000, while the fatalities from falls were 1 in only 25,000, or 16 times as numerous. In the same year there were 9409 fatal motor vehicle accidents in a population of 45,000,000, or approximately 1 per 5000 of population. The motor vehicle risk is thus 80 times the electrical risk to the user of either, and yet it is accepted by practically everyone.

Likewise in industry, the electrical accidents constitute a very small proportion of the total. As an example, the September issue of *Labor and Industry,* published by the Pennsylvania Department of Labor and Industry, reports for July a total of 142 fatal accidents which occurred during the course of employment in all industries in the state, but of these only 11 are chargeable to electricity, while 37 are chargeable to falling objects and 22 to cars and engines. We may conclude from these figures that the use of electricity is very safe comparatively, and the risk taken in using it far less than many other risks that are taken by all of us every day. We must give full weight to these facts in determining the standards of safety that are to be set for our industry.

It will be admitted that 100 per cent accident prevention can be obtained in the present state of human development only by complete cessation of human activity, even with unlimited expenditures of money for preventive measures. The engineer's ideal, therefore, will be to design, construct and operate with the least hazards reasonably possible. As already stated, money spent to reduce hazards must bring results commensurate with the expenditure. The results to be expected from a given expenditure are often difficult to predict, but all of the possible knowledge from experience should be made full use of through careful analysis of the cause and frequency of past accidents and of current accidents as they occur. It is necessary to give weight to the frequency of accidents from a given cause, as well as to the seriousness of the accident when it occurs. Thus certain classes of accidents, such as those resulting from stumbling, handling tools, and so on, are often unimportant individually, but because of their frequent occurrence accumulatively involve a loss of serious proportions which justifies taking comprehensive measures for prevention. On the other hand, accidents occur now and then of a very serious nature, resulting in fatality. In some cases, however, these accidents are so unusual, and involve such a peculiar combination of circumstances, that it would be entirely impracticable to apply preventive measures. An example from another industry may be cited. Trunk line railroads build two to four main line tracks quite close together on their rights-of-way. It is a generally known fact that long freight trains occasionally buckle, spreading some of their cars over one or more of the adjacent tracks. If another train is on the adjacent track at the moment of the accident or shortly thereafter, a very serious and probably fatal wreck will result. Nevertheless, this risk is accepted as a necessary one both by the railroad operators and the public because the chance of the combination of circumstances necessary to produce the fatal wreck is so extremely remote. In other words, the law of probability applies here, as everywhere else. The percentage of time during which any particular point on a track is occupied by a train is very small, so that the probability of two trains being together at the same point at the time of a wreck of one is almost nil. The probability of such accident is further kept down by careful inspection and maintenance of the braking system and skillful application of brakes, by effective block signaling, and other operating precautions. Nevertheless, because the hazard exists some might claim that multiple tracks should be so widely separated as to make accidents of this nature impossible—a solution that obviously would bankrupt the railroads. Similar situations exist in the power systems, particularly in respect to the conditions surrounding the operation of overhead circuits in the streets.

THE engineer, in dealing with accident hazards must take account of the fact that accidents are due to unsafe practices and lapses in human responsibility, as well as to unsafe plant conditions. There must be full cooperation between design and operating engineers so that the rules and regulations set up to govern employees and to protect the public in the hazards of electrical power systems are carefully and completely worked out and rigidly enforced. The design engineer will take care of the hazards through provision for adequate electrical and mechanical factors of safety, proper clearances and proper barriers for dangerous parts of the plant, and appropriate provisions for safe operation through the installation of suitable interlocks and other safety devices. The operating engineer will provide efficient maintenance for plant, and set up regulations governing the movements of his men in safe manner.

Our conclusion is, therefore, that codes for the control of hazards in our industry, both property and life hazards, must ultimately be based on a balance between the savings in accident cost by reduction of hazards compared with the cost of reducing them, with due regard for a just and reasonable public opinion. The other fundamental principle involved in code making is that code provisions must be based on well-accepted practice, the practical effect of which in use is well understood, and that experimental or unaccepted practices must not be included in codes. A major reason for the objection of the N. E. L. A. to the provisions of Article IX on Grounding of the 1928 edition of the National Electrical code was that new principles and new methods were rigidly set up as standards without having been given a trial in service to determine their effectiveness. Furthermore, it seems of fundamental importance that code provisions be based on facts and sound economic and engineering principles. If the economic requirements of codes are unsound, the progress of the industry will be retarded through the introduction of unjustifiable elements of cost into electric service and through the doing of injustice to some of those engaged in rendering service to the industry.

Recent N. E. L. A. Serial Reports are listed on inside page of back cover

Thus it is found that expenditures for reduction in hazards, whether to service, life or property, must bring results commensurate with the magnitude of the expenditure. While, on the one hand, we must accept the principle that it is not feasible to prevent all accidents, on the other hand it is equally essential that we recognize the full and complete cost of accidents, not only in direct costs but also in the more tangible but none the less real costs involved in their effect on organization, morale and public opinion.

This group is composed of those who have been appointed by their respective companies to handle code matters locally. From the engineering standpoint it is recommended that the following activities be covered in the work which they will do:

1. Become familiar thoroughly and in detail with all of the provisions of the codes of interest to them, particularly the National Electrical Code and the National Electrical Safety Code.
2. Study the effect on their respective organizations and physical plants of the various code provisions, both from the point of view of cost involved in complying with them and the results attained in reduction of hazards.
3. Investigate proposed new code provisions from the point of view of their local conditions, and be prepared to make recommendations. In considering new rules, full consideration should be given to possible savings in cost through reductions in hazards to life and property, improvements to electric service rendered customers, and improved public opinion.
4. Make a thoroughgoing analysis of past experience, as far as information is available in order to know with some degree of certainty the results of present practices and to provide a starting point for future work.

COMMENTS ON THE NATIONAL ELECTRICAL CODE

By A. R. SMALL

Chairman, Electrical Committee, N. F. P. A. and Vice-president of the Underwriters Laboratories

ABOUT three years ago I wrote an article for the magazine *The Electragist,* which had this opening paragraph:

> "During its thirty-year history, the National Electrical Code has been the product of the meeting of minds of representative of national bodies concerned in its field of application. This fact is the primary force responsible for the status of the Code throughout the land and for the very general recognition and support accorded its provisions by regulatory bodies, municipal or other, and by the producers and users of electricity. It is impossible to calculate the assistance this cooperation has given the growth in recognition and application of the use of electricity for light, heat and power within buildings which the public has encouraged and permitted in the period."

The article then proceeded to outline in full detail the organization and the procedure of the Electrical Committee and of an individual wishing a change in the Code requirements.

From its inception the National Electrical Code has sought to safeguard wired premises from the fire hazards which are inherently present when electric currents of commercial voltages are employed in buildings. These hazards are of many varied kinds. One early rule specified the use of screens or globes on arc-lamps to prevent particles of hot carbon dropping upon dry goods on counters in department stores. Present day rules seek to confine sparking and arcing parts to prevent ignition of inflammable and explosive vapors. The various aspects of the fire hazard continue to receive careful consideration and more or less elaborate treatment in the Code text.

From its inception the Code also dealt with workmanship in the installation of wiring and apparatus and with the quality and performance of the materials employed. The object sought thereby was probably to reinforce other provisions more directly addressed to the fire hazard, but the effect has been to set up a certain minimum standard as to workmanship and quality which has now become so established within the electrical industry as to prevail even in phases of application where the fire hazard is not a consideration. Except for major undertakings, property owners, architects and the general public expect that conformity with the Code's requirements guarantees acceptable performance, appearance and endurance of electrical installations. This particular condition is probably responsible for much, if not all, of the controversial situations which arise from time to time in Code affairs.

The two and more or less related efforts of safeguarding from the fire hazard and of securing good workmanship and materials were the principal code-making objectives for the first half of its existence. During the last ten or fifteen years another objective has been recognized and has come to have increasing attention and perhaps more attention (during the past few months anyway) than its relative importance justifies. This third and new objective is that of providing safeguards against injury to life and limb from shock and other ways in which electricity may provoke casualties.

Regulation to accomplish this objective was first demanded as the outcome of workman's compensation and employer's liability legislation. The first moves to satisfy these demands were met by the publication of the National Electrical Safety Code. Inspection authorities, principally state and municipal, applied the requirements of the Safety Code supplementary to the enforcement already established of the provisions of the "Fire Code." This, it was soon shown, was a clumsy and otherwise unsatisfactory procedure. It was obviously desirable anyway and in some ways essential that there be but a single code administered by a single authority, covering the details of a wiring installation. And so it has come about that, for wiring inside building, the Fire Code has been expanded more and more with the successive revisions so as to include recognized and established measures for prevention of electrical accident to consumers and users.

FOLLOWING my appointment as Chairman of the Electrical Committee, several major policies of the Code revision activity have been determined upon by the Committee and are in process of accomplishment, as follows:

a. The Committee has set up a detailed and orderly program for its procedure. It has only recently been reviewed by the Codes and Standards Committee of N.E.L.A. and has been approved as competently serving the interests of all concerned.

b. The Electrical Committee organization has been expanded so as to qualify as a Sectional Committee under the procedure of the American Standards Association.

c. As far as practicable the Code is to be confined to wiring and apparatus within consumer premises. Requirements for utility premises are to be stricken out.

d. The provisions of the Code are to be complete with respect to both fire and life hazards in the wiring of consumer premises so that all regulations applying thereto are to be found within the covers of a single publication; and finally,

e. Specifications for materials and like regulations which may not be applied by the inspector of wiring and at the consumer premises are to be taken out of the Code except as they are necessary to define what is acceptable to accomplish the intent of the wiring regulations.

I am sure that these major policies meet with your indorsement. They have not been fully carried out in the present edition, and it will be unreasonable to expect that they can be carried out in the next two or three revisions, but persistent attention to their principles will certainly insure much clarification in the Code's scope and detailed requirements in due course.

It is appropriate to discuss certain new ideas that are having application in the Code requirements. You are very properly concerned with the cost of wiring. This morning's talks show that your concern is deep and heartfelt. The Electrical Committee is under much pressure to adopt rules for the Code that will increase the initial cost of wiring a home. For example, Article 16 of the 1928 Edition specifies various branch circuits to be provided so that the expected use of current-consuming devices will not overload the branch circuits, will not result in blown fuses and will not add to the now too generous use of flexible cords. It is claimed and perhaps with reason that an initial investment providing these facilities will make more easy the early sale and use of current-consuming equipment in residence premises. If the public is to be taught to use this equipment, it is presumably reasonable to provide circuit equipment for it. And it is certainly an obligation on the Committee to prevent overloading, overfusing and a dangerous use of flexible cords.

The provisions of the 1928 Edition for use of the demand factor in determining upon copper sizes in risers and feeders certainly reduces the cost of wiring in the buildings and occupancies to which section 613 applies. Similarly the new provisions for motor-circuit wiring and fusing reduces the cost of wiring.

The situation which has brought about the organization of your Committee has seemed most disturbing to many who have felt that the status of the National Electrical Code has been impaired thereby. I have not shared these gloomy views, and now rejoice that out of the consideration given the Code by the executives of the utility industry there is the promise which this organization registers of constructive, technical and sympathetic cooperation in the future work of revising the National Electrical Code.

The activities of Underwriters' Laboratories in testing and classifying electrical devices and equipment, and in the preparation of standards applying thereto, are appropriately within the scope of your own concern. But time will not permit my describing them. Perhaps at some later meeting it will be my privilege to come before you and describe this work, so closely related to the National Electrical Code activity.

THE NEED FOR A MORE LIBERAL CODE

By E. W. Lloyd

Vice-president, Commonwealth Edison Company

WAYS and means to better the code is a very old subject. The report of a special committee made at a meeting in Philadelphia in 1914 aroused a great deal of interest. At that meeting I remarked that "There is only one point that I want to emphasize in connection with American practice and that is the present tendency of Underwriters to adopt such restrictions as will greatly handicap the development of small business. I do not want to be put on record as being in favor of unsafe wiring, but if their present methods are continued the Underwriters in this country will limit the expansion of this small business. I think it is possible for the manufacturers of wire and supplies in this country to get together with this body and the Underwriters and work out some system of wiring that will be acceptable to all, but on a much less costly basis than the present one."

The Underwriters, represented by Mr. Latta, took some exceptions to the remarks I made regarding restricting the code. Nothing transpired for a long time except that Mr. Blood has kept in touch with the situation before and since that time. I can easily understand the things that have caused the change that has taken place—the desire of the engineers to do a better job, the manufacturer desiring to produce a better product, and much more, all of which lead up to conditions that exceed the appropriate subject matter for a code.

I wonder if we realize the importance of our subject. It has been said by many important people that America's prosperity is based upon its production per man, but when we get right down to it I think we will have to say that it is also based upon the free use of electric power. Since the war, social and economic conditions have so changed as to alter our whole lives, and one of these important changes is that of labor in the home. Many women are doing all of their housework themselves. They find it difficult to employ help. Electricity in the home can do more to emancipate the women of our nation than anything I know, but we want them to have this electricity in a better way than now. Our industry has a vital responsibility to see to it that the kilowatt-hour is delivered to the home at the lowest possible cost. That cost is brought down by several things, among which is the freer use of electricity by those who now employ it; this will ultimately result in lower costs to everyone.

I believe that with the help of the men who are here today we will be able to devise a plan that will satisfy all concerned. The central station company needs the small business and the public wants the service. Those who look in an offhand way at the central station business say that we need no help, but the costs of power stations have materially increased in the case of a few of the larger stations, and if costs continue to go up, the situation will be still worse. Therefore, we need to look forward to the very near future when we will be selling more kilowatt-hours and thereby improving our load factor. At present the load factors of our systems rarely exceed 50 per cent, and this is too low. We are not selling enough kilowatt-hours.

THE average residential bill in America is $2.35 per month, and the average price per kilowatt-hour is under 7 cents. We have demonstrated in our own territory time and again that every time we cut the rate the use of electricity increases. We feel that $2.35 a month is such a small item in the family budget that surely the American people can afford to spend a good deal more. In each case, if that increase were 25 cents a month the total would amount to a very large figure, running into millions of dollars. There appears to be no doubt that the public wants and can advantageously use more kilowatt-hours, but that they cannot use them unless they install more wiring outlets.

You can make an analysis of any large industrial center in the United States and you will find that the use of electrical appliances is so small relatively that it is a reflection on the sales ability of our industry. We have a job on our hands to try to develop wiring, and systems of wiring, for the home that are both adequate and safe but which may still be installed at lower costs than those of today in order to make possible the use of electrical appliances with the greatest ease.

Surveys have revealed a very much underwired condition in the average American home. Some of our people in the electrical industry say that the cost of wiring has nothing to do with this situation, that it is merely a matter of selling. I cannot agree with this, for I have never found in all my business experience that high price offered no resistance. In a survey of 50,000 homes here in Chicago, we found that excluding lamps and fixtures and baseboard outlets the average number of outlets was seventeen, and I presume that figure would hold for the whole city. We found also that the number of baseboard outlets in the same group averaged only one and a quarter. We have made investigations into this situation, and we have found people running drop cords from ceiling outlets across the wall and down to some temporary outlet, and in other cases we have found cords running under rugs in many of the best apartments and homes in Chicago—thousands and thousands of them. Here in Chicago we were able to point out to other representatives of the industry that our existing local ordinance acted as a detriment and a drawback to the industry itself, since there was no means of serving a vast potential market that could be served if less expensive forms of wiring were available. Our ordinance was modified in an erperimental way to permit the extension of existing wiring systems in old residences by means of non-metallic sheathed cable. The results of this liberalization of the ordinance have more than justified the expectations of all concerned, and a handsome business has been done ever since the modification of the ordinance applying to the rewiring of old houses.

It appears to me that the subject of local electrical ordinances is one that should command executive attention in every central station company, and it is incomprehensible to me that any company or any local manager or superintendent should conceive that the local ordinance was not a matter of vital interest to the company and its officials. In various parts of the country local inspection rules are set up, often very drastic rules that differ in many respects from those of the National Code. I do not understand why people in the electrical business cannot agree to a universal, uniform standard of national rules so that we will not have these situations cropping up in all parts of the country. There is no subject that I have run across in my life that is so full of fearfulness and so overloaded with prophecies of the dire results that will follow upon the change in practices that may have been good twenty-five years ago. One would think, to hear some of the commentaries on proposed code changes, that in advocating the use of less expensive methods of wiring the advocates of such systems were indifferent whether they killed people at random or burned them up. We all must adopt a more optimistic and rational point of view, and above all we must "de-bunk" this wiring proposition, and I must record my opinion that it has an oversupply of this undesirable commodity. This situation is so charged with allegations of fearfulness that we do not get anywhere, and if this body of men feels as I do about it they can do a great deal toward de-bunking this code and all codes, so far as they refer to house wiring, and especially as to wiring in the American home. It took many years to get anywhere with non-metallic sheathed cable. Yet it is a perfectly good material that has amply proven its worth in practice, although many communities still will not permit its use. They have had concentric wiring systems for twenty-five years in Europe where they cannot by any possibility afford our costs, and this system has an admirable record for safety and service. In America the knob and tube system has an admirable record for safety and utility.

As I said before, this code situation has developed over a period of years to a point where the central station industry believes that the house wiring systems and the mass of regulations surrounding them have exceeded the bounds of reason and experience, and it is essential to our progress that we lend our efforts toward the adoption of regulations for house wiring that will permit our business to develop. The central station industry does not want anything that will interfere with the interests of other elements in the electrical industry, nor with those of the insurance companies. We have no desire to do harm to anyone, and we expect to act fairly toward all in the development of new systems and the scrapping of the old, but it is essential that there should be complete cooperation, because this is a very vital matter to all of us in the immediate future. Some of the present conditions must be changed, but in a way that will not interfere with the progress of any of the interests concerned.

This Half Century

(*Continued from page* 418)

should make sure that its own ethics and standards shall be above reproach. Its record of business enterprise and resourcefulness has invested it with peculiar distinction. It must maintain itself in public confidence by standards and practices that challenge the closest scrutiny. Possessed of the business enterprise which it has shown, and conducting itself so as to enlist the public confidence which it should possess, there stretches before it a limitless future, measured both in business opportunity and the satisfaction of social service.

When Thomas Edison forty-nine years ago established his Pearl Street lighting station in New York City, with 750 h.p. and fifty-nine customers, could he have possibly visualized the 2,100,000 h.p. generated in New York today? When as meter reader and bill collector he answered a complaint of overcharge at 23 Wall Street and convinced the Senior J. P. Morgan of the correctness of his lighting bill, could he have visualized the start of an industry that would dominate all industries?

A Challenge and an Inspiration

But at any scale of industry development, large or small, the qualities of intellectual stature, or earnestness of purpose, of simple sincerity, are the qualities which make his name inseparably connected with this new giant. They are the qualities which this industry may well pray will always mark its leadership. We properly celebrate tonight the Golden Jubilee of an epoch-making invention, and properly invest it with the character of a testimonial to private character and ability of which all America is proud. The history of this individual, and the history of all industry which has developed on the basis of his successive inventions, should give inspiration to American youth. I said earlier tonight, and I repeat, that the one deathless force in human life—a force from which human progress must inevitably continue to develop—is the power of the human intellect. I recall again a striking assertion of Mr. Kettering in which he states that "Whatever is within the range of the human mind to imagine, that thing can be done."

That note is a challenge and an inspiration, even as it is a characteristic of this industry and the individual whom we are honoring.

Reprints of addresses made at N. E. L. A. Convention are listed on page 414

SURGES AND FLASH OVERS

By Fred W. Herbert

Director, Service Department, NELA

The medical profession with all its research has not made a pill that will cure a grouch.

* * *

A great many husbands are like furnaces—always smoking and you have to keep an eye on them or they go out.

* * *

There is a slogan—"Feed a cold and starve a fever." The girl we had out to dinner the other evening must have had a cold but *no fever*.

* * *

Is the wonderful electrical development of today a debt due from the present to future generations?

* * *

We can't all live on the sunny side of the street, but you don't have to be shady folks just because you live on the other side.

* * *

There seems to be a war on in perfumes. One smell is trying to drown a worse one.

* * *

"One good turn deserves another"—Not if you disobey "No left turn" sign. Your next turn is in the police court. Not so good.

* * *

How times have changed — Formerly we were taught to pass a red light and keep out of jail. Now— pass a red light and you land in jail.

* * *

Birth notice in a local paper. Born—To Mr. and Mrs. A. P. Nutt a baby girl which has been christened Hazel. Why handicap the kid?

* * *

The reading of students just after leaving college is the "Help Wanted" column.

* * *

Cast your bread upon the waters and it may come back to you in dough.

* * *

Agricultural research benefits the farmer but how much more does it benefit the city resident by better food production and distribution.

* * *

Blood will tell — Applicable to human beings as well as race horses.

* * *

Real happiness is never costly, but if you take a poor substitute you will find it exorbitant.

* * *

Those people who are continually giving a piece of their mind are losing their mind continually.

* * *

David Harum said that fleas were good for a dog — they kept his mind off of other worries.

National Section Chairmen Are Appointed for the New Administrative Year

PRESIDENT SLOAN has announced the appointment of the four National Section Chairmen for the administrative year 1929-1930. They are: for Accounting National Section, W. R. Emerson, Oklahoma Gas and Electric Company, who succeeds J. F. Ford, of the Philadelphia Electric Company; for Commercial National Section, Marshall E. Sampsell, Illinois Public Service Company, reappointed; for Engineering National Section, Alex D. Bailey, Commonwealth Edison Company, who succeeds E. C. Stone, Duquesne Light Company; for Public Relations National Section, Harry Reid, National Electric Power Company, who succeeds J. F. Owens, Oklahoma Gas and Electric Company.

The new section Chairmen, who assumed their duties the first of July, have already appointed a number of the Committee Chairmen for their respective sections and all appointments are expected to be made before the end of the month. An organization meeting of the Public Relations National Section will be held at Chicago on July 17th and the Accounting National Section will hold an organization meeting on the same date at N. E. L. A. Headquarters in New York. Organization meetings of the Commercial and Engineering National Sections will also probably be held in July.

Mr. Emerson

Mr. Emerson, the new chairman of the Accounting National Section, is a native of Tennessee, and was born in 1886. Since 1905 he has been associated with public utilities in Oklahoma. He entered the service of the Muskogee Gas and Electric Company as a day laborer in November, 1905. He later occupied the positions of time keeper, collector, clerk, cashier, general bookkeeper, and auditor, to the spring of 1917, when he was promoted to the position of assistant manager of the Muskogee Gas and Electric Company. He served in this capacity until November, 1917, when he was transferred to Oklahoma City and made secretary, treasurer, and general auditor of the Oklahoma Gas and Electric Company.

In this capacity he has taken an active part in the development of the utility accounting system of the Byllesby Engineering and Management Corporation in Chicago, this company being the management corporation for the Oklahoma Gas and Electric Company.

From December, 1917, to April, 1918, he served in Washington as a dollar a year man in the reorganization and decentralization of the American Red Cross.

He has taken an active part in the work of the Accounting Section of the National Electric Light Association since the Geographic Divisions were first started, serving on various committees, and in 1925-1926, served as chairman of the Accounting Section of the Southwestern Geographic Division, later being made a vice-chairman of the National Accounting Section, in which capacity he served from 1926-1929.

Mr. Sampsell

A native of Marshall, Texas, Mr. Sampsell, reappointed chairman of the Commercial National Section, was graduated from the University of Chicago in 1896, and from the Chicago College of Law in 1899. He was clerk of the United States Circuit Court for the Northern District of Illinois from 1902 to 1907. He began his public utility career in 1903 as receiver for the Chicago Union Traction Company and other affiliated street railway companies. During the several years of this receivership, Mr. Sampsell took an active part in the street railway negotiations of that period, which resulted in the adoption of the famous Chicago traction settlement ordinance of 1907. Mr. Sampsell is a director of the Middle West Utilities Company and president of the Central Illinois Public Service Company, and Wisconsin Power and Light Company, two of its largest subsidiary companies. He has served as president of the Illinois Electric Railway Association and of the Great Lakes Geographic Division of the National Electric Light Association, and has been vice-chairman of the Public Relations Section, and during the past year, chairman of the Commercial National Section. He is also vice-president of the National Electric Light Association.

Mr. Bailey

Mr. Bailey, new chairman of the Engineering National Section, was born in Wisconsin in 1882, and has lived in Chicago since the age of seven. After graduating from Lewis Institute (Chicago) he worked for a short time for the Evanston Heating Company, and entered the employ of the Chicago Edison Company (a predecessor of the Commonwealth Edison Company) late in 1903, as mechanical engineer at the Harrison Street station. His evenings for five years were spent as instructor at Lewis Institute.

After three years at Harrison Street station, he was transferred to the Engineering Department of the company, where he spent the next two years planning general engineering work. In 1906 he was sent to Fisk Street station as Assistant Chief Engineer, and, later, became Chief Engineer of this station. On January 1, 1921, he was appointed Superintendent of Generating Stations of the Commonwealth Edison Company, which position he now holds.

Mr. Bailey is the author of numerous articles on the electric utility industry. Among the committees on which he has served are: Of the Commonwealth Edison Company, chairman, Generating Station; Accident Prevention; Trial Board; Advisory; Engineering; Labor Efficiency; 60-Cycle System Power Factor; Central Safety; Construction. Of the N. E. L. A., vice-chairman of the Engineering National Section; Counsellor of the Prime Movers Committee. Of the American Association of Mechanical Engineers, Main Research Committee.

Mr. Reid

Mr. Reid, new chairman of the Public Relations National Section, was a prominent figure in public utility circles in Kentucky and the Middle West for twenty years, although a native of New York. He first entered the electric light and power industry as an employee of the Fulton County Gas and Electric Co., Gloversville, N. Y., and after serving that utility in various capacities, he, with several others, purchased the Versailles (Ky.) Electric Light Company. Mr. Reid became interested in syndicating a number of public utility companies in central Kentucky, and later affiliated himself with the Kentucky Utilities Company, which was organized by the Insull interests, in the capacity of vice-president and general manager, in 1913, he was elected president of this company. In 1917 he was elected to the presidency of the Interstate Public Service Company. In 1927 he became president of the National Electric Power Company with offices in New York.

Mr. Reid has devoted considerable attention to association work, having taken an active part in the affairs of the National Electric Light Association, the American Institute of Electrical Engineers, the American Electric Railway Association, and the National Institute of Social Sciences.

Progress of National Food Preservation Program

By C. E. GREENWOOD

Vice-Chairman, Executive Committee, National Food Preservation Council

THE objective of the National Food Preservation Council in the promotion of National Food Preservation Month in September of this year is to impart knowledge and to impress the homemaker with the need of proper food protection in the home, and its relation to the public and family health.

September was chosen because of the vital need of promulgating the Food Preservation message at a time when so many homemakers feel that the "hottest" days are over and the use of ice or other refrigeration is not essential. It is a scientific fact that bacteria grows rapidly on food which is kept in a temperature above fifty degrees Fahrenheit. The insignia of the Council is therefore a thermometer indicating 50 deg. as the safety point.

IN no part of the country is there any considerable period when outside temperatures are within refrigerating range, that is between 32 deg., which is the freezing point, and 50 deg., which is the point at which bacteria begins to multiply.

Reports of the United States Weather Bureau show on the average only nineteen days throughout the year when the temperature in the United States throughout twenty-four hours is never below 32 deg. nor above 50 deg.

Even Commander Byrd, who is at present shut up for a four months' Winter period, finds it necessary to have artificial refrigeration to maintain a proper temperature for food storage.

Few people are acquainted with food temperatures, nor are they deeply concerned with the need of food protection. Only 15 per cent of the homes of the country ice their refrigerators all year round, which means that only those homes, and the homes using mechanical refrigeration, can possibly have an average of 50 deg. or under for proper food preservation.

Note the statement—an "average" of 50 deg. The "50 deg. danger point" used in earlier publicity material of the Council has been a controversial subject with some of the local ice interests. The intent of the Executive Committee of the Council is to join forces with the ice industry in promulgating an important and helpful message to the public. Changes in our earlier publications have been willingly made that we might advance with united front in our crusade. The National Food Preservation Program is a notable activity because it is educational in appeal and broadly cooperative in its execution.

Dr. Royal S. Copeland, an outstanding health authority, states "Health is life's greatest asset. To preserve health is to perpetuate happiness and success. So much depends on the food we eat that the proper care of the food in the home is a paramount public, as well as private, responsibility. The National Food Preservation Program—a movement looking toward wider knowledge of the scientific principles of food handling—is deserving of cordial commendation."

Dr. Louise Stanley, Chief of the Bureau of Home Economics, United States Department of Agriculture, states the Bureau of Home Economics will be very glad to cooperate with the various refrigeration interests in preparation of material for the Food Preservation Program and to indorse its activities, and that she will be glad to serve in any way that time will permit as a member of the National Food Preservation Council.

The Program has received the indorsement of such widely and favorably known associations as:

National Dairy Council
General Federation of Women's Clubs
National Refrigerator Manufacturers' Association
American Institute of Refrigeration
American Bottlers of Carbonated Beverages
National Retail Furniture Association
Refrigeration Division, National Electrical Manufacturers' Association
American Gas Association
Society for Electrical Development
Association of Edison Illuminating Companies

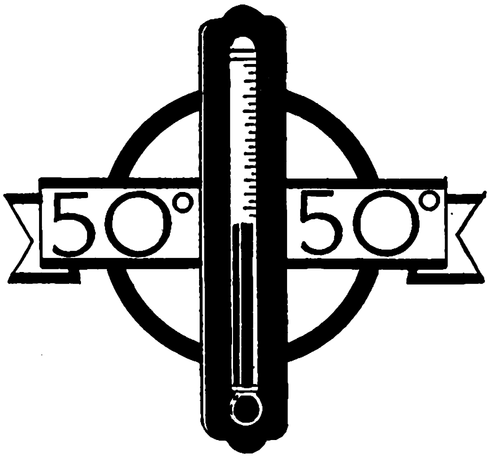
in addition to our own Association.

State and city organizations are rapidly being perfected by the Regional Directors of the Council. Many local units are in action. Newspapers are supporting the Program in full appreciation of public interest involved and several have already signified their intention to issue Food Preservation Supplements during September.

THE $25,000 National Contest has been announced and four page spreads have been placed in the September issue of such advertising mediums as *The Saturday Evening Post, Good Housekeeping, Literary Digest, Woman's Home Companion, Liberty, Ladies' Home Journal* and others. Millions of readers will be attracted by the Contest and will give special attention to food preservation. National judges will be men of prominence—Merle Thorp, Editor of *Nation's Business;* B. C. Forbes, Editor of *Forbes Magazine,* and Dr. Walter Hollis Eddy, Professor of Physiological Chemistry, Columbia University. We expect at least a million contestants to submit essays.

Upon the invitation of Mr. Matthew S. Sloan, President of the Council, Dr. Royal S. Copeland, United States Senator from New York, and Dr. Louise Stanley have been added to membership on the Council.

Contributions from the manufacturers who are supporting the national movement are still being received. The national fund will be matched multi-fold by local advertising and promotional activity of the power companies and other cooperating groups. So many executives of our industry have written hearty indorsement of this activity of the Commercial National Section that the Executive Committee of the Council, under the leadership of Mr. Marshall E. Sampsell, are highly confident of an outcome which will be of public benefit and one which will be to the ultimate advantage of all commercial interests in the refrigeration field and helpful to associations that are striving to promote better public health.



Insignia of National Food Preservation Council

Light's Golden Jubilee

ALL OVER the United States keenest interest in Light's Golden Jubilee is being manifested. Newspapers and magazines generally are showing enthusiastic approval of this universal celebration in honor of Mr. Edison and the fiftieth anniversary of the invention of the practical incandescent lamp; government officials, foreign countries, municipalities, universities, civic clubs, and many other organizations are cooperating in the most wholehearted manner.

Two publications have just been issued covering the story and plans on Light's Golden Jubilee.

The official Jubilee Book issued by Light's Golden Jubilee Committee, 420 Lexington Avenue, New York, tells the story of the Jubilee, the nature of this tribute to Edison, its inception, and how it is to be carried out. It is the official story of the Jubilee, released by the general committee of which President Hoover is honorary chairman. This sixteen-page book, in two colors, carries, in addition to the story of the Jubilee, information and data on the accomplishments of Thomas Edison in the various fields in which he has worked. All those interested in the Jubilee will want copies of this official Jubilee book in order that they may get the complete story of the celebration. Where communities are planning to take part in this world-wide tribute, copies of this book will prove ideal for distribution to all interested parties.

THE other book, published by the National Electric Light Association, entitled "Suggestions for Local Participation in the World Wide Tribute to Thomas A. Edison," contains forty-four pages, with a striking four-color insert. It is a publication local committees should use in deciding upon their method of organization and the ideas and plans they will use for local celebration. It also carries several pages listing material available for use in connection with local celebrations.

The book itself is divided into three parts. The first part states briefly the high-spots of the Jubilee, what it stands for, and why it should be carried out.

The second part gives suggestions in picture and text form, as to organization, who should be interested, what towns of various sizes can do, and then a wealth of ideas in connection with methods of celebrating the tribute. Among these are included pageants, parades, fairs, carnivals, fireworks, radio, libraries, schools, colleges, music, airports, street lighting, festooning, floodlighting, steam beacons, fountains, window displays, theatres, etc., etc.

The third part, under the head of Material Available, includes a list showing the picture, description, prices, and name of manufacturer and material. Among this material is a replica of first lamp, reprint of a New York *Herald* issued in 1879 describing Mr. Edison's lamp, electrotypes, official Edison picture, portfolios on arches, pageants and parades, book matches, stickers, outdoor posters, lighted wreaths, lighted plaques, lighted frames, transparent signs, pennants, display banners, metal medallions, lighting appliques, etc., etc.

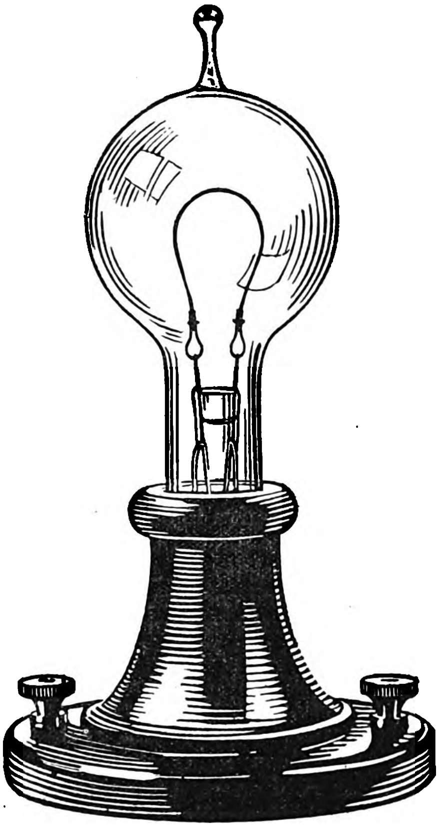
TO EDISON

When great God spake, "Let there be light! —
Did He forever banish night?

Did He make man insensate clod,
Or breathe in him the breath of God?

Man's night has proven man to be
The offspring of Divinity.

God willed that man should rule the night;
Man speaks, and God anew gives light.
—Nicholas Bryant Cook.



Replica of
Thomas Alva Edison's
FIRST INCANDESCENT LAMP

The following prominent men and women have accepted membership on the General Committee in charge of Light's Golden Jubilee:

Miss Jane Addams
James R. Angell
Gen. William Wallace Atterbury
Gen. Robert Lee Bullard
Dr. Nicholas Murray Butler
The Rev. S. Parkes Cadman
Newcomb Carlton
Walter P. Chrysler
Paul D. Cravath
P. E. Crowley
John W. Davis
Gen. Charles G. Dawes
George Eastman
Harvey S. Firestone
Hon. John S. Fisher
Dr. Simon Flexner
Henry Ford
The Rev. Harry Emerson Fosdick
James W. Gerard
W. S. Gifford
Miss Virginia Gildersleeve
Hon. Fred W. Green
William Green
Will H. Hayes
Dr. John Grier Hibben
A. B. Houghton
Roy W. Howard
Charles Evans Hughes
Otto Kahn
Hon. Morgan F. Larson
Clarence H. Mackay
Dr. Charles Horace Mayo
Dr. William James Mayo
Hon. Andrew W. Mellon
Hon. Dwight W. Morrow
Prof. E. L. Nichols
Frank B. Noyes
Dr. Henry F. Osborn
Gen. John J. Pershing
Dr. Michael F. Pupin
Fred W. Ramsey
A. W. Robertson
H. M. Robinson
John D. Rockefeller, Jr.
Julius Rosenwald
Charles M. Schwab
Mrs. John F. Sippel
Dr. Samuel Wesley Stratton
B. E. Sunny
Paul M. Warburg
Daniel Willard
Dr. Stephen S. Wise
Owen D. Young

Herbert Hoover, *Honorary Chairman*

A recent communication from J. F. Quinlan, executive secretary of Light's Golden Jubilee, states that among the 22 embassies which have already indicated their cooperation in the celebration, are the Italian Legation, the Roumanian Legation, the Royal Danish Legation, the Royal Norwegian Legation and the Canadian Legation; among the 13 states whose governors will cooperate, are, Massachusetts, Ohio, Kentucky, California and Texas; among the 19 cities whose mayors will cooperate, are San Francisco, California; Atlanta, Ga.; Detroit, Mich.; St. Louis, Mo.; and Atlantic City, N. J.; and among the 80 universities who will cooperate are Cornell University, Princeton University, College of the City of New York, Dartmouth College, Smith College, University of Alabama, Wellesley College, and Mount Holyoke College.

One hundred and eighty million of the special Jubilee stamp issue have been struck off by the Government engraving plant. The stamps are now on sale at all the larger post offices, and they can be secured by any postmaster upon request to Washington. It is the hope of Light's Golden Jubilee Committee that all light and power companies will use the stamps wherever possible between now and October 21, the date of the culmination of the celebration.

The Edison Song. composed by George M. Cohan, and first sung last month at the Fifty-second Convention of the National Electric Light Association, is expected to have a wide distribution.

Mr. Cohan has not only dedicated this song to the Jubilee, but has specifically stated that it is a complimentary song, for which he expects no recompense. He stipulated that the song should not be sold through regular channels for profit. He is, however, agreeable to the sale of the song with the profits and royalties turned over to some worthy cause, as the partial financing of an Edison monument at Menlo Park. Plans as to how this is to be done are being worked out at the present time.

Arrangements have been completed with Thomas A. Edison, Inc., Phonograph Division, to release this song in record form, played by B. A. Rolfe. Arrangements are also being made to have both Victor and Brunswick reproduce the song in record form. These records will be sold through the regular channels, but the profits and royalties are to be turned over to a fund such as mentioned previously.

Golden Jubilee Celebration at Niagara Falls

PRONOUNCED a complete success, the four-day celebration of Light's Golden Jubilee and the Fifth International Festival of Lights at Niagara Falls, came to a close on Sunday, June 16, having attracted more than 150,000 visitors.

Beginning with the arrival of Queen Electra on Thursday afternoon and continuing throughout the four days, the program was packed with spectacular events. The Queen and her court arrived by airplane and dedicated the new municipal air field in the afternoon. In the evening the coronation of the Queen was staged on City Hall steps before a battery of movie cameras and a crowd estimated at 5000 people. She then took her place in the throne car and led the four-mile pageant parade with its 60 illuminated floats and many marching bodies through the streets of the city. The entire route of the parade was decorated with American and Canadian flags, gold and white bunting and golden banners announcing Light's Golden Jubilee, while the street lights were converted from white to gold by the use of mica color caps inside the globes. The floats in the parade were magnificent and were recorded by every film service, both silent and sound, in the United States.

Friday was devoted to a celebration of Flag Day, together with a pageant in the afternoon by the Boy and Girl Scouts on Green Island in the American channel above the falls. In the evening Queen Electra and her court held forth at an open-air ball in the streets. The limits of the dancing space were marked with strings of multicolored lights in which the golden lights predominated.

Three parades were staged Saturday morning, afternoon and early in the evening by members of the Loyal Order of Moose, who were meeting in convention during the celebration. Shortly before 9 o'clock a train a 50 years ago, labeled the New York Central Jubilee Special, arrived with a party of 100 tourists in the costumes of 1879. These proceeded to Falls Street, and in hacks and horse cars went to Prospect Park, where they witnessed a reproduction of the original lighting of Niagara Falls in 1879. Open type arc lamps threw the lights through colored glass slides on a small fountain in the park, and operating the lights and fountain were the same men who handled the original installation. Then, with breath-taking suddenness, the full force of the 1,440,000,000 candlepower searchlight battery were swung against the falls in golden lights as a tribute to Thomas A. Edison. Swinging up into the sky, the searchlights performed the ghost dance and sky drills, and then, as they dropped back on the falls, an airplane circled over Goat Island, and from the dark released a barrage of aerial bombs in a sham air raid on the island. Rockets and bombs were shot up from the cliff in imitation of an anti-craft battery, while the searchlights pinned the airplane against the clouds. This spectacle, which attracted such a crowd that it took five hours for traffic to clear, was described, during the General Electric hour on a coast-to-coast hook-up of radio stations, by Graham NcNamee standing with one foot in Canada and one foot in the United States on the Falls View Bridge. Philips Carlin, at the base of the falls, put Niagara's voice on the air, while Paul Dumount and the regimental band of the Toronto Regiment furnished the musical interludes for the radio program.

Local Knights of Columbus sponsored a Pontifical High Mass on Goat Island Sunday, commemorating the 250th anniversary of the discovery of Niagara Falls by Father Louis Hennepin. This event was broadcast by station WKBW of Buffalo, and silent and sound pictures were made by every film service present. This colorful ceremony attracted another large crowd, and Goat Island was a sea of faces during the mass.

Through radio, movies, newspapers and actual attendance it is estimated that more than 4,000,000 people heard, read or saw the Golden Jubilee and International Festival of lights celebration at Niagara Falls.

Californian Wins "Light's Golden Jubilee Essay Contest"

WILLIAM M. FISHER, of the Los Angeles Gas and Electric Corporation, has been named as first prize winner in the nation-wide "Light's Golden Jubilee Essay Contest." Along with first place, he wins a cash prize of $150.

William F. Galloway of the Middle West Utilities Company, Chicago office, won second place in the competition, and $75.

Honorable mention fell to Travis L. Bogue of the Public Service Company of Oklahoma, at Tulsa.

This contest, which ran from May 1 to 15, was open to all employees of member companies of the N. E. L. A., except to officers, managers, department heads and those who specialize in the sale of light. One hundred and sixty-two essays were submitted to the office of W. S. Vivian, contest conductor, in the two weeks of its duration.

The judges were: Earl Whitehorn, editor of the *Electrical World;* D. L. Gaskill, secretary of the East Central Division of the N. E. L. A.; and Miss Sophia Malicki, of the Midwest Utilities Company.

Service Suggestions
NATIONAL ELECTRIC LIGHT ASSOCIATION — COMMERCIAL NATIONAL SECTION
CUSTOMER RELATIONS COMMITTEE
H. T. EAST, *Chairman*, Public Service Co. of Northern Illinois, Chicago, Ill.
To formulate efficient methods of conducting relations between the customer, the public and the supply company, including such matters as taking applications in the office, forms, order routing, inquiries, complaints, meter reading, collections and credits

No. 73 **July, 1929**

Mechanics of Correspondence

By FRANK R. MITCHEL

Georgia Power Company, Atlanta, Georgia

THE CUSTOMER Relations Committee in this article stresses the necessity and importance of a survey and check-up on the handling of company mail. Reference is also made to a follow-up system which will insure prompt replies, and to a filing system.

An exhaustive study of systems followed by various companies has been made to obtain ideas for the guidance of others. At first thought the subject may be considered so simple that it does not deserve much thought or consideration. However, it is the things of apparently little consequence that often bring embarrassment and ill-will to the operating company. The little slights often cut more deeply and remain unhealed for a longer period than a grievance of much greater proportion, since the larger and more serious complaints are practically always brought to our attention while the smaller often do not reach us. These fancied slights are often nursed and remembered by the customer, who awaits an opportunity to even up the score. Nothing so chagrins the average person as the failure to receive a reply to a letter he has taken the trouble to write and send.

No company would knowingly permit a letter to remain unanswered, but this often occurs on account of a loose system of handling mail or the carelessness of some employee.

There are few companies which do not occasionally receive a letter complaining that no reply was received to a letter of certain date. Requests made by letter frequently do not receive attention. All letters deserve and should receive a prompt and courteous reply. Therefore, it should be impressed upon every member of each organization that prompt attention must be given every communication received.

Most companies have a lock drawer at their local post office. With rare exceptions every letter will be placed in this box. From the time it is put there the responsibility rests with the company. No one but a careful and trusted employee should have possession of the post office box key. Preferably only one person should have this responsibility, and if this is not practical the responsibility should be restricted to as few employees as practicable.

The removing of the mail from your box and the delivery of it to the proper department in your company are steps that should be carefully supervised. Mail will occasionally be lost if a suitable container is not provided the messenger. This should be securely locked or closed.

HELP?

Light and power companies frequently have problems of policy or procedure on customer relations matters which are difficult of solution. It is the function of the Customer Relations Committee to aid companies in solving such problems. The committee will be pleased to receive requests for opinions of its members and will also endeavor to obtain the experience of operating companies for your guidance.

Address such requests direct to the chairman.

H. T. EAST, *Chairman,*
Customer Relations Committee,
1427 Edison Building,
Chicago, Illinois.

In preparing this article the writer purposely visited his local post office several times, investigating and forming an opinion as to how the mail of the various business houses was handled. It was astonishing indeed to see the general carelessness that prevailed. It was surprising to see the great number of messengers whose satchels were much too small for the bulk of mail collected from their respective boxes. Consequently, many employees left the building with satchels that could not be closed on account of being overfilled. You can draw your own conclusions as to whether all of this mail reached its destination. It was still more astonishing to see the number of young women and young men, as well as porters and messengers, that came for their mail without any receptacle whatsoever. Scores would leave with their arms full of mail of every description. It is practically impossible for this procedure to go on, day after day, and several times each day, without a considerable loss of mail. Naturally, there were messengers that handled their jobs in a most systematic, businesslike way. They had well-designed satchels, or mail bags, and were careful in collecting all of the mail from the drawer. Satisfying themselves that no mail was left, either in their drawer or upon the floor, their bags were locked and the keys returned to their pockets. This insured their offices receiving all mail intact. The importance of systematizing this detail of your business can be readily seen.

Where mail is delivered by carrier a well-designed receptacle of ample size should be provided and this located where the mail will be safe at all hours.

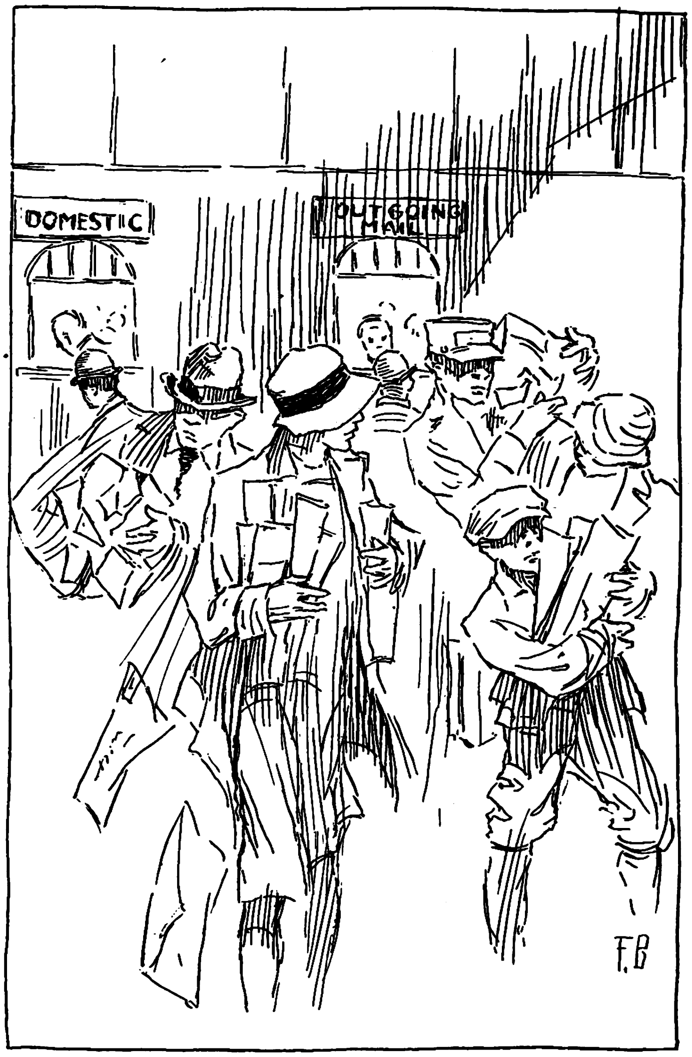
No doubt most utility companies have a fairly good mail handling system, but many of the larger utilities have made an extensive study of this particular phase of their business and have developed ideas which could profitably be used by others.

A mail department is a service department. It should be so organized as to fulfill this purpose thoroughly and efficiently, always keeping the interest of the company's patrons in mind. Most important of all is the selection of the proper employee to have charge of the mail room. This is doubly important in companies which have assigned to this employee the duty of directing the mail to the various departments and officials of the company. Considerable responsibility is attached to this duty, and a well-trained, well-informed person should be placed in charge of this work. On this employee several of our largest and foremost utilities place the responsibility of receiving, opening, sorting, reading and routing of all mail received addressed to the company. Naturally, all outgoing mail passes back through this same department.

A study of the systems used by the various companies forces the conclusion that conditions throughout our country are so varied that no one system, however well perfected, can be applied to all companies alike.

A few of the outstanding utilities of the United States have practically perfected their mail handling systems. It is doubtful whether smaller companies could economically adopt such systems in their entirety. One highly systematized company prefers the plan of requiring their mailing department to remove the contents of all the company's mail and classify it before assorting it for the various departments. For instance, all overdue bills are placed in one lot and sent to the cashier's office, bill and check being pinned to the envelop. Correspondence, with checks attached, is kept separate and sent to the cashier, where it is given priority over all other mail, in order that the correspondence attached may be returned to the mail room, where it is dispatched to the department interested. Still another separation is made of the checks sent to pay current bills. These are assorted into three lots as follows:

1. All bills which require receipts.
2. All checks with stubs which do not require receipts.
3. All money orders sent in payment of bills.



Drawings by Frank Barnes, Brooklyn Edison Co.

It was astonishing to see the general carelessness that prevailed

These three lots are delivered to the cashier's department. All bills sent in for purchases are stamped as to time received, as from this stamping the company regulates the time taken for discounts. Invoices for coal are sent to the fuel department, other invoices go to the purchasing department, and so on through the list.

Every effort should be made to discourage the sending of stamps and money through the mail. But when such mail is received the mail clerks should initial the envelope and turn it over immediately to the supervisor, whose duty it is to list such mail and send it direct to the cashier or his assistant.

A record of all registered mail should be kept in the mail room and a receipt obtained when it is delivered to the proper party. While individual receipts are more practical for use in large companies, it appears that the use of a register would be more convenient for the smaller ones. Either plan is satisfactory.

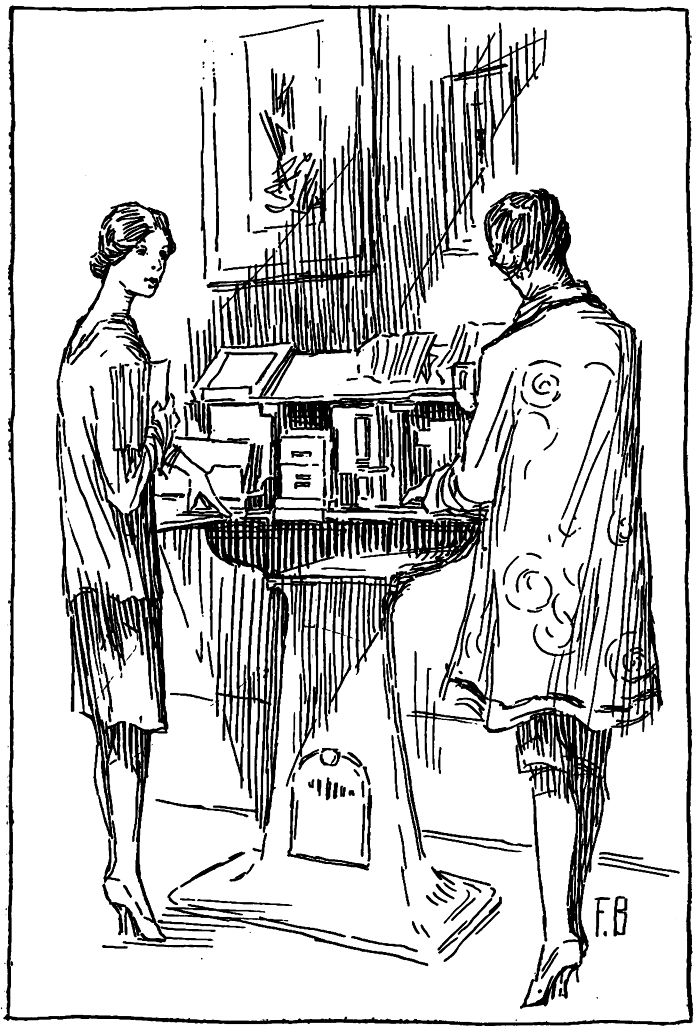
Each piece of mail received should bear a stamp showing the time it reached the company's office. Mail should, of course, be distributed without delay. The employee selected to assort incoming correspondence must possess a general knowledge of the personnel and the functions of each department. It is also advisable to designate an employee in each department who will receive its mail.

Officials of the smaller companies do not generally favor the practice of separating the mail to the extent followed by most of the large companies. They believe that all mail containing checks should be classified as cashier's mail, and sent direct to that office. It is their opinion that this class of mail should be handled by the tellers in that department. Upon the cashier would devolve the duty of sending correspondence accompanying remittances to the proper department. Great care must be taken to see that notations and memoranda made on the face or reverse side of the invoice are not overlooked. Many of our customers have the habit of making their wants known in a most original and sometimes crude manner. Frequently such notations as "Bill too high," "Please investigate bill," "Have not been home but a few days this month," "Do not want to buy your company," and other like expressions appear on a bill. Experience has proved that correspondence of this type is more serious than the average business letter of complaint. It has been demonstrated that the customer who has written a long letter of complaint has eliminated much of his ill-feeling, while the customer who has made a short, terse statement often has ill-will pent up in his system. If the same consideration is given to these terse complaints as is given to our general correspondence much unpleasantness can be averted. *They should be referred at once to the department responsible* for high bill complaints.

The trained eye of the teller is more apt to catch these notations than the employees of the mail department and they should therefore be definitely instructed concerning their disposal.

Too much stress cannot be placed upon the importance of a prompt reply to every letter. A 24-hour limit for reply has been established by many companies. However, there are many letters of such a nature that cannot be answered immediately. Coming under this head is what we term high bill complaints. A letter which cannot be answered promptly should be acknowledged at once, notifying the customer that his request shall receive immediate attention and that the result of the investigation will be sent at an early date.

Many companies do not consider that a personal call answers a letter. When a representative is sent to explain a matter a letter is written either to inform the customer of the call or to state that the call was made. This plan has merit. It is interesting to note here that in at least one state the public utilities commission requires all written complaints to be acknowledged in writing.



A machine which imprints an index, in lieu of stamps

A correspondence record is one means of avoiding failure to answer letters. Such a record shows name of sender, date and time of receipt, brief statement of subject, date of acknowledgment, to whom referred within company, and final disposal. By checking back periodically letters not answered can be quickly identified and the average elapsed answering time can quickly be determined.

This brings us to a discussion of the control of correspondence. The limited number of companies that have adopted the idea of correspondence control have found it very satisfactory. It will readily be seen that a system of this nature must be highly specialized. It requires that the correspondence department obtain speedy and accurate information from all of the departments of the entire organization in order that the numerous and varied correspondence can be satisfactorily and accurately handled. The head of such a department must necessarily be a man of considerable ability, with a general insight into the entire business.

All the details of the various systems in use today cannot be set forth in a paper of this nature. It will be worth the time of officials of companies who feel that their correspondence is not systematized to make a more extensive study of the systems used by some of the larger utilities. The officials of each company know their particular requirements and can best judge the system best suited to their needs. But the importance of standardizing our correspondence should be evident to all.

Inter-office mail must not be overlooked. Every company has a large amount of correspondence between the various departments, and it is important that this mail should be systematized. Prompt replies, together with accurate and speedy delivery are necessary in all departments of all utilities of the present day.

Any article on the subject of correspondence control should not overlook the outgoing mail. The system used by one of the larger utilities which maintains a mailing department, is presented as a typical set-up which covers outgoing mail handling.

All of the departments of this company are required to send all their outgoing letters to the mail room. Where there is no return card on the envelop it is put through a mailo-meter, where it is sealed, stamped and counted, under one operation, at the rate of 200 a minute. As the mail comes out of this machine it is properly faced, sorted, and bundled into local and out-of-town mail, and delivered in locked mail pouches to the post office.

A recent regulation of the United States Post Office Department permits the use of a machine which imprints an index in lieu of stamps. This imprint also serves as a cancellation mark. Permits can be obtained from local post offices for use of such machines. Eighty per cent of this company's mail is sent through machines of this type. By their use stamping, dating and timing are accomplished at one operation and mail service is speeded up. All departments are urged to send mail out when ready and not wait till near close of business. The mail goes to the post office hourly, 70 per cent being in the post office by 4 p. m.

The department that receives and distributes your mail, in connection with every other department of your organization, expands with its growth. With the ever-increasing responsibility that is being added to this department, too much attention cannot be given to its formation and management.

The Customer Relations Committee issues a service suggestion monthly. Each contains some workable plan for service improvement or idea which will aid in promotion of customer good will.

Subjects of recent issues were:

63—*Courtesy Letters.*
64—*Tree Trimming from Public Viewpoint.*
65—*The Telephone as a Service Medium.*
66—*Handling Requests for Discount Allowances.*
67—*Informing our Customers About our Business.*
68—*Training Employes in Customer Relations.*
69—*Records That Speed Service.*
70—*Employe and Consumer.*
71—*Correspondence for Good Will.*
72—*Teaching Customers to Read Their Meters.*

Reprints of the present issue or any of those listed above can be furnished in any quantity at 5c. each. Order direct from the chairman.

H. T. EAST,
1427 Edison Bldg.
Chicago, Ill.

INTERPRETATIONS of ELECTRICAL DEVELOPMENT

By Statistical Research Department, N.E.L.A.

Basic statistical information on the electric light and power industry issued monthly by the Statistical Research Department of the National Electric Light Association,* 420 *Lexington Ave., New York, N. Y.

H. A. Snow, *Chairman, Statistics Committee, Accounting National Section*
Wm. M. Carpenter, *Research Statistician*
H. S. Bennion, *Director of Engineering, N. E. L. A.*
Merle Rainey, *Statistician*

Current Statistics of the Electric Light and Power Industry

The data here presented are for the total (100 per cent) electric light and power industry and are based on monthly reports received from some 400 companies, representing over 86 per cent of the industry.

	MARCH		Per Cent Increase	APRIL		Per Cent Increase
DURING MONTHS OF MARCH AND APRIL	1929	1928		1929	1928	
*Kw-hr. generated (net)	7,486,236,000	6,695,351,000	+11.8	7,279,347,000	6,357,342,000	+16.1
Add—energy imported from Canada and purchased from outside the Electric Light & Power Industry	202,208,000	225,732,000	−10.4	181,533,000	186,407,000	− 2.6
Less—energy used in electric and other departments	219,000,000	236,000,000	− 7.2	206,000,000	224,000,000	− 8.0
Total energy for distribution (kw-hr.)	7,469,444,000	6,685,083,000	+11.7	7,354,880,000	6,319,749,000	+16.3
Sales of energy in kw-hr. for:						
Farm service (not involving irrigation)**	6,072,000	2,651,000	....	6,831,000	....	....
Farm service (involving irrigation)**	47,659,000	41,469,000	....	77,214,000	....	....
Domestic service	834,822,000	729,243,000	+14.5	795,044,000	683,525,000	+16.3
Commercial service:						
Small light and power	1,072,469,000	947,226,000	+13.2	1,056,965,000	930,073,000	+13.6
Large light and power	3,501,600,000	3,156,292,000	+10.9	3,761,825,000	3,195,321,000	+17.7
Railways and railroads (motive power)	466,870,000	488,941,000	− 4.5	438,250,000	442,545,000	− 1.0
Other sales to ultimate consumers	191,683,000	162,381,000	+18.0	161,796,000	152,285,000	+ 6.3
Total sales to ultimate consumers (kw-hr..)	6,067,444,000	5,484,083,000	+10.6	6,213,880,000	5,403,749,000	+15.0
Total revenue	$169,785,000	$157,752,000	+ 7.6	$168,137,000	$153,893,000	+ 9.3
Revenues from sales for resales and miscellaneous (included above)	9,635,000	8,021,000	+20.1	8,816,000	7,804,000	+12.9
DURING THE TWELVE MONTHS ENDING	MARCH 31			APRIL 30		
*Kw-hr. generated (net)	84,282,892,000	....	....	85,304,897,000	....	....
Add—imports from Canada and purchases from outside the Electric Light & Power Industry	2,237,940,000	....	....	2,233,066,000	....	....
Less—energy used in electric and other departments	2,612,000,000	(Comparable data will be available with the December 1929 report and at the end of each month thereafter)	....	2,594,000,000	....	....
Total energy for distribution	83,908,832,000		....	84,943,963,000	....	....
New generating capacity installed (kw.)	1,900,000		....	1,925,000	....	....
Number of new customers added:			....			
Farm customers	1,147,400		....	....	....	....
Domestic customers	....		....	1,186,900	....	....
Commercial customers	261,700		....	197,800	....	....
Others	....	....	....	1,500	....	....
Total customers added	1,409,100	....	....	1,386,200	....	....
Important factors:						
Percentage of energy generated by waterpower	38.8	....	....	38.7	....	....
*Average pounds of coal per kw-hr. generated	1.70	....	....	1.70	....	....
Domestic service (residential use):						
Average annual consumption per customer (kw-hr.)	468	....	....	472	....	....
Average revenue per kw-hr.	6.50	....	....	6.44	....	....

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*By courtesy of the U. S Geological Survey with deductions for plants not considered electric light and power enterprises.

**As reported by 197 companies only.

Basic Information on the Electric Light and Power Industry

As of April 30, 1929

The data included in this table are basic factors of the electric light and power industry and will be brought up-to-date at the end of each month and published in each issue of the BULLETIN.

1. Value of plant and equipment (estimated)	$10,200,000,000
2. Total generating capacity in Kw	27,972,000
Steam	20,040,000
Waterpower	7,636,000
Internal combustion	296,000
3. Total number of customers served	23,697,000
Farm customers	226,400*
Domestic customers	19,382,000
Commercial customers	4,282,000
4. Population in electrically lighted homes (Electrical World)	81,500,000
5. Percentage of homes which are served with electricity	66
6. Miles of transmission lines (11,000 volts and above) (1927) (circuit miles)	132,000

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* As reported by some 197 companies only.

N. E. L. A. Index of Industry and Trade

CONTINUED high records in the activity of industry and trade are shown by the statistics of the output of the country's electric light and power plants as reported by the United States Geological Survey.

The production of electricity during May by all the agencies which contribute to the country's supply, as given by the Survey, was 8,093,373,000 kilowatt-hours, an incraese of 13½ per cent over the same month of last year.

According to these figures, the Electrical Index of Industry and Trade, prepared by the National Electric Light Association indicates that business in May was 12.8 per cent above the normal for that month, as measured by the trends of the past ten years. This is a gain of nearly one per cent over the figure for April, which, in turn, stood at the highest figure since the great industrial activity of the years 1919-1920.

As measured by the output of electricity, business was extraordinarily active in the entire region east of the Mississippi. On the Pacific Coast, industry and trade are also substantially above last year's levels. A slight recession in mining activity is, however, indicated by the fact that the Rocky Mountain region, as a whole, showed an increase in output of only four per cent above last year.

The index, month by month, for the current period and for the previous two years, stands as follows:

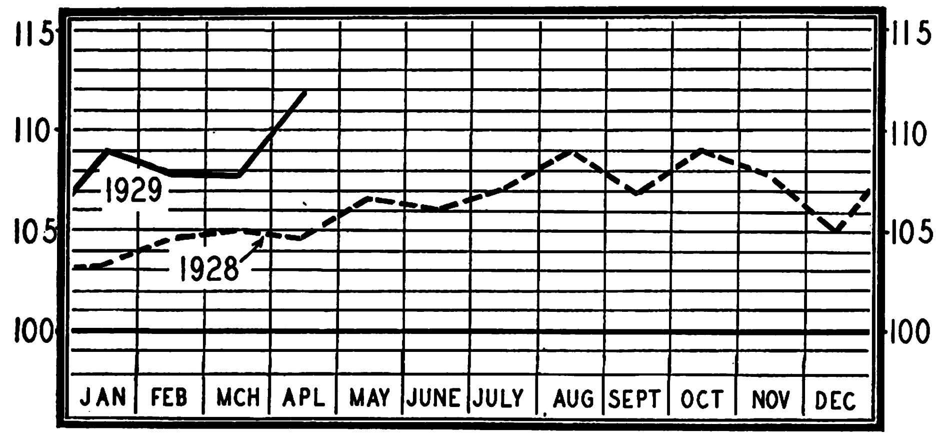
Electrical Index of Industry and Trade

	1927	1928	1929
January	104.9	103.2	109.0
February	103.8	104.7	107.9
March	106.9	105.0	107.8
April	106.8	104.6	111.9
May	106.3	106.6	112.8*
June	106.1	106.0	
July	104.8	107.1	
August	104.9	108.9	
September	104.8	106.8	
October	102.6	109.0	
November	102.9	107.8	
December	103.1	105.0	

* Subject to revision.

The N. E. L. A. Index of Industry and Trade is based upon the deviation of the total output of electricity by all agencies which contribute to the public supply plus imports from Canada, from a computed "normal" figure for each month, which "normal" is adjusted for the continued growth of the light and power industry and is further corrected for seasonal variation.

ELECTRICAL INDEX OF INDUSTRY AND TRADE



National Electric Light Association Statistical Research Department

Taxes Consume Ten Per Cent of Light and Power Company Revenue

TAXES paid by the electric light and power companies in 1928 were the highest on record and showed an increase of $7,000,000 over the figure for the previous year, according to the Statistical Research Department of the National Electric Light Association. The sum total of payments made to all tax-collecting agencies in the United States (local, county, State and Federal) for 1928 amounted to $165,000,000, as compared with $158,000,000 in 1927 and $137,000,000 in 1926. These figures are approximately 10 per cent of the revenues received by the electric light and power companies from the ultimate consumers of the energy they distribute. In other words, every time the average user of electricity pays a dollar for his service, he is really paying ten cents toward the conduct of government, while the electric light and power company is only getting ninety cents.

During the past fifteen years taxes have increased almost twice as rapidly as have revenues from consumers. In 1928 revenues were approximately seven times as large as they were in 1912, whereas taxes were nearly thirteen times as large. This rate of increase is more than three and a half times that of the steam railroads, whose taxes are now only three and a half times the total of 1912. A comparison of the taxes paid by the electric light and power companies and the Class I railways of the United States shows the increasing burden which is being carried by the user of electricity as compared (for instance) with the user of transportation.

Total Taxes Paid

Year	Electric Light and Power Companies	Class I Steam Railways
1912	$13,000,000	$110,000,000
1922	73,000,000	301,000,000
1926	137,000,000	389,000,000
1928	165,000,000	389,000,000

1912	Railroad taxes 8½ times electric
1922	Railroad taxes 4 times electric
1926	Railroad taxes 2¾ times electric
1928	Railroad taxes 2⅓ times electric

If present trends continue, the public utilities of the country will be paying as much in taxes as the steam railroads during the present year. An estimate of the tax accruals for 1929 shows the following approximate figures:

Taxes—1929

Electric light and power	$172,000,000
Electric railways	62,000,000
Manufactured gas	54,000,000
Telephones and telegraphs	100,000,000
Total (not including water works)	$388,000,000

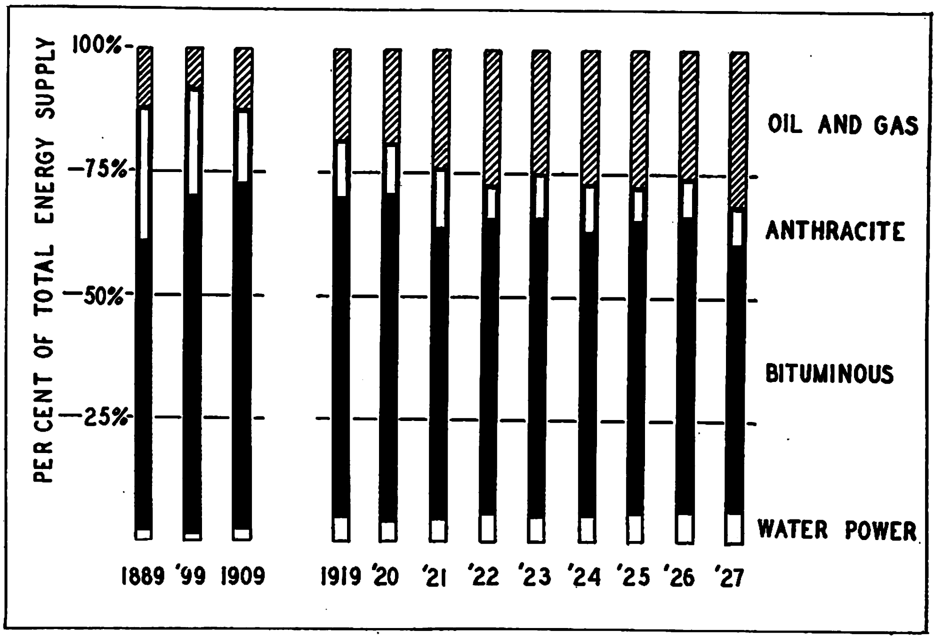
Energy Supply of the United States

According to a bulletin recently published by the Bureau of Mines, Department of Commerce, the total consumption of energy in the United States—that is, energy from all sources, including coal, oil, natural gas, water power, firewood, animals and windmills—is equivalent to 1,000,000,000 tons of coal per year. Of this amount, bituminous coal furnishes a little over one-half of the country's requirements.

To those who believe that water power will eventually provide most of the energy required by industry, transportation and other activities, it will be interesting to note that in 1927 it supplied but 6.3 per cent of this energy. Domestic and imported oil accounted for 21.4 per cent, natural gas for 5.8 per cent, coal (anthracite and bituminous combined) 58.4 per cent, firewood 5.5 per cent and animals 2.5 per cent.

In other words, oils supplied approximately 3¼ times as much, and coal 9 times as much energy as water power.

The accompanying chart shows the relative changes in the proportion of the major components of the grand total of the nation's supply of energy.



(U. S. Bureau of Mines)

Proportion, in the total supply, of energy derived from various sources

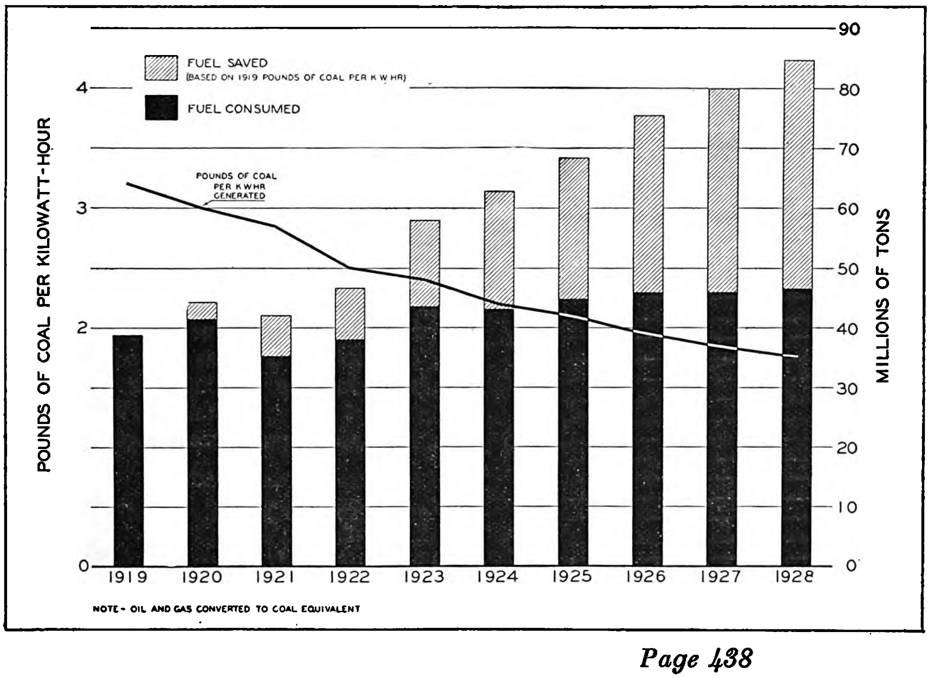
Conservation of Natural Resources Accomplished by Electrical Industry

The accompanying chart shows in a graphic manner the contribution to the conservation of natural resources which is being made by the constant improvement in facilities, larger units, interconnection and greater efficiencies in the electric light and power industry.

"During the last 25 years," states the U. S. Bureau of Mines in its recent publication, *Coal in* 1927, the total production of electric power by central stations and electric railways has increased nineteenfold. Part of the increase is due to the development of hydro power; but, nevertheless, the production of fuel power has risen from 4,000,000,000 kilowatt-hours in 1902 to about 53,000,000,000 in 1928, an increase of thirteenfold. The consumption of coal has increased during the same period, but in much smaller ratio. In 1902, the utilities used, in round numbers, 11,000,000 tons; in 1928 they used 41,300,000, an increase of less than fourfold against the thirteenfold increase in power production.

"This astonishing result has been made possible by improvements in fuel efficiency. In 1902 the average consumption per kilowatt-hour was about 6.6 pounds; by 1917 this had been cut to 3.3 pounds. Particularly rapid progress has been made since the war, and in 1927 the average fell to 1.84 pounds. Even this is much above the performance of the best plants today, and one station on the Ohio river below Cincinnati has touched a record of 0.86 pound per kilowatt-hour generated."

The constantly increasing efficiencies of steam generating plants located at or near available markets for power are making them serious competitors of hydro-electric enterprise, particularly when the location of the water power is such as to require heavy investments in long-distance transmission lines.



Statistical Data of the Electric Light and Power Industry for the Year 1928

PREPARED BY THE STATISTICAL RESEARCH DEPARTMENT OF THE ASSOCIATION WITH THE COOPERATION OF THE STATISTICS COMMITTEE OF THE ACCOUNTING NATIONAL SECTION, N. E. L. A.

THE statistics herein reported embrace the operations of enterprises devoted exclusively to the generation and distribution of electricity, plus the electric departments of all others which maintained electric light and power systems jointly with other public utility services. These "composite" companies constitute approximately three-quarters of the total number.

These data were determined from reports received at N. E. L. A. Headquarters from some 365 companies, whose operations represented approximately 85 per cent of the entire industry and, together with the published returns of municipal systems and of others filed with various Public Service Commissions, were prorated to cover 100 per cent of the total electric light and power business.

Comparison with Previous Statistics

In this statement detailed comparisons have been made with corresponding figures collected by the Association for the years 1927 and 1926 and with those collected by the U. S. Bureau of the Census for 1922.

An effort has been made to account for the entire operations of the electric light and power industry, including the light and power business done by electric railways. In past reports to the U. S. Bureau of Census composite companies operating both power and traction systems in many cases did not separate their light and power business from their traction business, and a certain percentage of the former was therefore included in the Electric Railway Census. For that reason, in comparing these data with census reports, the following percentages are necessary to place them on the same basis:

1926, 1927 and 1928: The figures herewith represent 100 per cent of the electric light and power industry.

1922: Census figures represent 93 per cent of the electric light and power industry.

1917: Census figures represent 92 per cent of the electric light and power industry.

1912: Census figures represent 90 per cent of the electric light and power industry.

The forthcoming 1927 Census of the electric light and power industry is expected to separate the operations of the various utility services and, as its schedules are in close similarity with the N. E. L. A. forms, will show figures which are comparable with those outlined in this statement.

Growth of the Industry During 1928

Table I shows the outstanding features of the growth of electric service in the United States during the past year.

The number of domestic consumers increased by 1,163,000 or by 6.5 per cent. This was somewhat smaller than the 1,337,000 increase shown during 1927 or the 1,383,000 shown during 1926. This, however, is in line with expectations, inasmuch as the aggregate of unwired houses is steadily diminishing in urban communities and the number of

TABLE I

SUMMARY—ELECTRIC LIGHT AND POWER INDUSTRY 1922-1928

	1928	1927	1926	1922(a)	% Increase 1927-1928
Number of establishments*(a)	....	4,327	....	6,355	...
Commercial	....	2,135	....	3,774	...
Municipal	....	2,192	....	2,581	...
Prime movers*(a)					
Number	....	12,007	....	13,242	...
Horsepower	....	35,622,593	....	19,850,860	...
Kilowatt capacity of generators*	27,310,000	25,420,000	23,733,000	14,313,438	7.4
Kilowatt-hours generated	81,868,420,000	74,335,070,000	67,775,212,000	40,291,536,035	10.1
By fuels	49,381,786,000	46,543,740,000	43,247,306,000	....	6.1
Water power	32,486,634,000	27,791,330,000	24,527,906,000	....	16.9
Fuel used, equivalent short tons of coal	42,633,000	41,700,000	40,950,000	....	2.2
Pounds of coal per kw-hr. generated	1.73	1.79	1.89	....	—3.4
Number of customers*	23,235,500	21,834,100	20,329,000	12,709,868	6.5
Domestic customers (including farms)	19,077,000	17,913,900	16,577,400	10,211,232[b]	6.5
Commercial customers and others	4,158,500	3,920,200	3,661,600	2,498,636[b]	5.4
Revenues from sales of electricity to consumers	$1,801,438,000	$1,664,775,000	$1,469,126,000	$940,162,000	8.2
Average revenue per kw-hr. sold	2.64c.	2.70c.	2.65c.	2.79c.	—2.3
Domestic service:					
Average use per consumer, kw-hr	459	429	404	359[c]	7.0
Average annual bill per consumer	$30.10	$29.20	$28.26	$26.50[c]	3.1
Average revenue per kw-hr. sold	6.55c.	6.80c.	6.99c.	7.39c.[c]	—3.7
Percentage of homes served with electricity*	66	63	60	39[b]	4.8

Notes: *As of December 31st.
(a) U. S. Census of Electric Central Stations.
(b) "Electrical World"
(c) N. E. L. A.

TABLE II

GROWTH OF USE OF ELECTRICITY BY ITS CONSUMERS

	1928	1927	Increase	% Increase 1927-1928
Kilowatt-hours Sold to Ultimate Consumers				
For farm service (included below)	(See table VI)	....	....	...
Domestic	8,489,000,000	7,389,000,000	1,100,000,000	14.9
Commercial (small light and power—retail)	11,504,000,000	10,580,000,000	924,000,000	8.7
Commercial (large light and power—wholesale)	41,056,000,000	36,787,000,000	4,269,000,000	11.6
Street lighting	1,525,000,000	1,349,000,000	176,000,000	13.0
Street and interurban railways	4,545,000,000	4,634,000,000	— 89,000,000	—1.9
Electrified steam railroads	562,000,000	481,000,000	81,000,000	16.8
Miscellaneous services	424,000,000	371,000,000	53,000,000	14.3
Total	68,105,000,000	61,591,000,000	6,514,000,000	10.6
Revenues Received from Ultimate Consumers				
Domestic	$555,944,000	$502,743,000	$53,201,000	10.6
Commercial (small light and power—retail)	523,180,000	484,528,000	58,652,000	8.0
Commercial (large light and power—wholesale)	591,195,000	553,834,000	37,361,000	6.8
Street lighting	74,566,000	68,340,000	6,226,000	9.1
Street and interurban railways	42,316,000	43,523,000	— 1,207,000	—2.8
Electrified steam railroads	5,617,000	4,933,000	684,000	13.8
Miscellaneous services	8,620,000	6,874,000	1,746,000	25.4
Total	$1,801,438,000	$1,664,775,000	$136,663,000	8.2

new customers depends more and more upon new building construction. This in turn is showing increasing signs that the deficiency in housing which originated during the war period is rapidly being overcome.

Electricity used in domestic service has shown the increase of more than a billion kw-hr., reflecting an enlarged use per customer, as well as the growth in their numbers. The total energy used in the country's homes and farms grew, during 1928, by nearly 15 per cent. This is a considerably larger proportionate growth than that shown by commercial service.

The generation of energy by electric light and power plants increased by 7,543,390,000 kw-hr., or by 10.1 per cent over 1927, and attained the record total of 81,868,420,000 kw-hr.

Generating Capacity, installed in these plants, increased by 1,890,000 kw., or by 7.4 per cent. Of this increase, 1,271,000 kw., or about 67 per cent, was in fuel-using equipment, and 619,000 kw., or about 33 per cent in hydraulic, of which 252,000 kw. was located in one large installation.

All generating plants taken together, the electric light and power industry operated at an average of 35.5 per cent of capacity, as against 34.5 per cent in 1927 and 33.8 per cent in 1926.

Revenue from all classes of consumers increased by $136,663,000, or by 8.2 per cent. This was substantially less than the $195,649,000 increase between the years 1926-1927, and reflects in no small degree the results of the industry's general policy of passing on to the public the benefits resulting from the economies of improved engineering and management.

TABLE III

COMMERCIAL STATISTICS—SALES OF ENERGY

Sales to Ultimate Consumers	No. of Customers	Kw-hr. Sold	Revenue
Farm service (included below, for details see Table VI)	(175,913)	(1,066,764,000)	($19,870,000)
Domestic service (all uses, including non-irrigated farm service)	19,077,013	8,489,332,000	555,944,300
Commercial service			
(a) Small light and power (retail)	3,583,522	11,504,346,000	523,179,900
(b) Large light and power (wholesale, including irrigated farm service)	546,073	41,055,721,000	591,194,800
Municipal street lighting	20,257	1,524,308,000	74,565,600
Railroads—motive power			
(a) Street and interurban railways	461	4,545,022,000	42,316,500
(b) Electrified steam railroads	20	562,160,000	5,617,000
Municipal and miscellaneous	8,105	423,666,000	8,620,200
Total to ultimate consumers	23,235,451	68,104,555,000	$1,801,438,300
Sales for Resale			
Municipal electric distribution systems	751	964,524,000	$12,547,200
Other electric companies			
(a) Sold at points within State lines	1,222	8,471,275,000	68,655,300
(b) Sold at State line for export over State lines	163	3,735,740,000	26,161,800
Total sales for resale	2,136	13,171,539,000	$107,364,300
Grand Total Sales (kw-hr. duplicated by energy sold for resale)	23,237,587	81,276,094,000	$1,908,802,600

Note: Number of customers added during year.

Farm Service Domestic Service	1,163,062
Commercial Service:	
(a) Small Lt. & Pr. (retail)	204,810
(b) Large Lt. & Pr. (wholesale)	30,201
All Others	3,350
Total added during year	1,401,423

Use of Electricity—Table II

While a substantial increase in revenue was registered in every classification, it will be noted from Table II that the rate of increase in revenues received from domestic service was much *less* than the rate of increase in kilowatt-hours sold. This is reflected in a notable drop in the average price paid by the domestic consumer. The summary of the industry's growth is outlined in Table I, and a comparison between sales and revenues in the several classes of service follows in Table II.

Sales of Electricity—Table III

These are presented in tabular form, comparable with figures published in previous statistical bulletins.

The "number of customers" constitutes the total number of locations which involve contractual obligations on the part of the electricity supply systems to render service. The actual interpretation of this term, as well as its distribution between the various classes of service, has been determined by the individual companies reporting.

Figures covering farm service, which are shown on both the N. E. L. A. and the U. S. Census forms, have been included in "domestic service" for service not involving irrigation and under "commercial service—large light and power (wholesale)" for service where irrigation pumping occurs.

Limitations of Certain Statistics

The interlinkage of the various utilities operated jointly within the same organization in the "composite" companies, together with the fact that much of the property is used in common, renders the exact distribution of many items a matter of considerable difficulty and, in the last analysis, often a question of individual judgment on the part of the reporting company.

In addition, the diversity of rate schedules has made it impossible for all companies to render returns exactly conformable to the particular classifications requested in the annual report form and thereby has necessitated some use of estimates for such companies. While calling attention to the desirability of statistical uniformity throughout the industry, it is felt, however, that the comparatively small number of these instances has not entailed any appreciable degree of error in the final results.

It is gratifying to note that an increasing number of companies evidence a willingness to make the separation of their service in accordance with the classifications of the N. E. L. A. and Census schedules.

Trends in Use and Price of Electricity During 1928—*Table IV*

Reduced to over-all averages, the use of service by the several classes of ultimate consumers in 1928, as compared with 1927, is shown in Table IV.

There has been an increase of 30 kw-hr. in the average amount used by the average domestic consumer, reflecting the continued results of larger appliance use and increased accuracy of reporting. This increase in use more than offsets the comparative falling off in new customers, so that the total number of kilowatt-hours sold for domestic service shows a record gain of 1,100,000,000, or 14.9 per cent over 1927.

Partly because of this enlarged use and partly because of the industry's general policies, the average price of domestic service has declined by 2.5 mills per kw-hr., or by 3.7 per cent during the year, leaving the average revenue per customer only 3 per cent above what is was in 1927. Combining the results of this table with those of the Rate Research Committee and other studies by the Association, the following changes in the cost and use of domestic service have taken place since 1914:

TABLE V—DOMESTIC ELECTRIC SERVICE

Year	Average Use, Kw.-hr.	Average Annual Bill	Average Price Paid Per Kw.-hr.
1914	268	$22.25	8.30c.
1922	359	26.50	7.39
1926	404	28.26	6.99
1927	429	29.20	6.80
1928	459	30.10	6.55

Due, in part, to a general tendency toward lower rates and, in still greater measure, to increased industrial activity over the previous year, the average revenues received per kilowatt-hour sold for commercial purposes showed a slight decline over the rates of 1927. Average revenues from small light and power sales decreased by 0.3 mills, or by 0.7 per cent, and those from large light and power decreased by 0.6 mills, or by 4 per cent.

Rates are constructed to fall with the increase in the quantity used per customer. Thus, in years of prosperity the proportion of power sales in the grand total rises while its average price drops; in years of slackened operations, the proportion of power drops while its average price rises. No argument can therefore be maintained upon the comparative prices, trends or proportions between domestic and commercial electricity, unless the relative industrial activity of the country is considered.

Farm Service—Table VI

The Association has again attempted this year to collect statistics covering the amount of electricity used by agricultural consumers. Table VI shows the

TABLE IV

THE AVERAGE ELECTRIC CONSUMER

	In 1928				In 1927			
		Average per Consumer				Average per Consumer		
Class of Service	Average Number of Consumers	Sales Kw-hr.	Revenue	Average Revenue per Kw-hr.	Average Number of Consumers	Sales Kw-hr.	Revenue	Average Revenue per Kw-hr.
Domestic (all uses)...............	18,495,000	459	$30.10	6.55c	17,219,000	429	$29.20	6.80c
Commercial:								
Small light and power (retail)....	3,481,000	3,305	150	4.55	3,326,000	3,076	146	4.58
Large light and power (wholesale)	531,000	77,320	1,113	1.44	539,000	68,243	1,027	1.50
Total commercial	4,012,000	13,100	$285	2.11c	3,864,000	12,555	$268.72	2.19c
Railways	481	.....	......	....	.....	.....	......	0.95
Municipal and miscellaneous (a)	28,000	.....	......	....	27,500	.....	......	4.37
All ultimate consumers.........	22,535,000	3,022	$79.94	2.64c	21,112,000	2,917	$78.85	2.70c

Note (a) Including street lighting.

TABLE VI
FARM SERVICE AS INDICATED BY 125 COMPANIES REPORTING

Classification	Number of Customers Reported	Kilowatt-hours Sold	Revenue	Annual Average per Customer Kw-hr. Sold	Annual Average per Customer Revenue	Average Revenue per Kw-hr. Sold
Farms involving irrigation............	68,811	1,007,144,000	$15,510,000	17,000	$263.50	1.55c
Farms not involving irrigation.........	107,102	59,620,000	4,361,000	674	49.20	7.30c
Total..........................	175,913	1,066,764,000	$19,871,000	......	......	....

In the preparation of Table III (commercial statistics—sales of electricity), farm service not involving irrigation, as set out above, has been included in "domestic service" while farm service involving irrigation has been included in "commercial service—large light and power (wholesale.)"

kilowatt-hours sold and revenues paid for this energy as recorded by those companies which were able to report farm service as a separate classification. This table may, therefore, be considered merely as a cross-section of rural electric service. It does not show the totals for the entire country, as the bulk of the business is still included by many companies under the single classification of "domestic service."

Farm service in the United States is broadly divisible into two distinct classifications: (a) service on irrigated lands and (b) service on non-irrigated lands. The first classification applies to practically the entire country west of the 100th meridian (i. e., the Pacific and Mountain States, plus the western parts of the Plains States, roughly outlined by the "dead line" of 20-inch rainfall of old pioneer days) and to the States of Texas, Arkansas and Louisiana. The second classification embraces the rest of the country, although the increased use of electric-pumps for irrigation is generally noted not only in semi-arid regions but also in those of considerable (though seasonal) rainfall. For the reason that irrigation pumping is an item of such magnitude as to completely mask all other agricultural operations, Table VI has been set up in two divisions, the second one of which is representative of the average performance of the average farm.

It is gratifying to note, and is of hopeful significance for the future, both of agriculture and of the electric light and power industry, that, as reported by the 125 companies that have been able to keep separate records of their actual performance, the use of electricity per farm is already considerably in excess of urban domestic requirements.

TABLE VII
SOURCE AND DISPOSAL OF ENERGY

Source of Energy		Kilowatt-hours
Generation—		
By fuels		49,381,786,000
Water power		32,486,634,000
Total generation (net)................................		81,868,420,000
Energy from Other Sources—		
Excess of imports from Canada over exports (a).........	1,157,624,000	
Net energy received from various Federal, State, and District projects and from industrial plants..............	1,269,383,000	
Total energy from other sources............................		2,427,007,000
Total energy available for distribution.......................		84,295,427,000
Disposal of Energy		
Sales to ultimate consumers (see Table II).........................		68,104,555,000
Used in other departments..............................	1,341,780,000	
Used in electric raidway department.....................	1,128,544,000	
Total company use..		2,470,324,000
Total accounted for...		70,574,879,000
Balance unaccounted for (losses, etc.)............................		13,720,548,000
Total energy distributed..		84,295,427,000
INTER-UTILITY TRANSACTIONS		
Purchased or Transferred Energy Received		
Imported from Canada (a)...........................	1,356,453,000	
Received over State lines.............................	9,080,000,000	
From other electric companies within State lines..........	10,167,565,000	
From other sources (manufacturing plants, public works, etc.)	1,269,383,000	
Total energy received..		21,873,401,000
Energy Sold or Transferred for Resale		
Exported to Canada.....................................	198,829,000	
Exported over State lines...............................	9,080,000,000	
To municipalities within State lines......................	964,524,000	
To other electric companies within State lines............	9,203,041,000	
Total energy for resale..		19,446,394,000
Net energy received from other sources........................		2,427,007,000

Source and Disposal of Energy—Table VII

Of the total energy available during the year 1928 for distribution to the public, 58.4 per cent was generated by fuels and 38.5 per cent by water power. The balance, or 3.1 per cent, was imported from Canada or received from Federal, State and District hydro-electric projects or from industrial enterprises which were not public utilities. These figures show a rise in the proportion of water power in the total of distributable energy, which is the result, in part, of a year of comparatively more copious rainfall and of better stream flow and, in part, of the commencement of operations of one very large new hydro-electric installation. Due, however, to the increasing efficiency of steam-electric generation and to the numerous economic factors which follow in its train, it is to be doubted that this represents a trend which will persist.

Fuel Used in Electrical Generation, Table VIII

Table VIII gives a summary of the fuel used by all the electric light and power plants of the country during 1928. These produced 49,392,000,000 net kw-hr. through the consumption of fuel equivalent to 42,633,000 short tons of coal. This indicates an average net use of 1.73 pounds of coal per net kw-hr. generated, as against an average of

1.79 pounds in 1927 and of 1.89 pounds in 1926.

TABLE VIII

FUEL USED FOR ELECTRICAL GENERATION—1927

Coal (anthracite and bituminous, in short tons)	37,616,000
Oil (in 42 gal. bbls.)	6,834,000
Gas (in 1000 cu. ft.)	76,903,000
Total fuel (including small amounts of fuels not shown above) in equivalent short tons of coal	42,633,000
Energy generated by use of fuels	49,382,000,000 kw-hr.
Pounds of coal (or its equivalent) per kw-hr.	1.73 lb.

Transmission Lines, Table IX

Table IX shows the circuit miles of transmission lines of companies reporting to the N. E. L. A., grouped according to their major classifications. In addition, there are shown the individual voltages in most common use, as reported by identical companies during the past three years, and a comparison of the proportion of lines carrying these voltages to the total mileage. Of the voltages in most common use, the largest rate of growth is indicated in lines carrying 66,000 volts, which now comprise 15 per cent of the total mileage. It is gratifying to note that there is a steady trend toward the adoption of voltages recommended as standard and a corresponding decline in the proportion of lines carrying odd voltages.

TABLE IX

TRANSMISSION LINES OF COMPANIES REPORTING TO N. E. L. A.

Voltage (U. S. Census Classifications)	Circuit Miles 1928	Circuit Miles 1927
11,000 but under 33,000 volts	49,745	48,587
33,000 but under 66,000 volts	48,405	41,171
66,000 but under 110,000 volts	24,378	22,244
110,000 but under 220,000 volts	16,016	14,699
220,000 volts or more	2,980	1,257
Total	141,524	127,958
Estimated national total	150,000	......

VOLTAGES IN COMMON USE

(For Identical Companies Reporting by Voltages in 1926, 1927 and 1928)

	1928		Per Cent of Total Reported		
Voltage	Number of Companies Reporting	Circuit Miles Reported	1928	1927	1926
220,000**	3	1,590	1.4	1.2	1.2
132,000**	34	3,878	3.5	3.7	2.9
110,000*	32	7,577	6.8	7.4	7.9
66,000**	79	16,943	15.3	14.5	13.8
60,000	16	6,316	5.7	6.1	5.3
44,000*	24	5,503	5.0	5.4	5.3
33,000**	95	19,191	17.3	17.4	18.3
22,000*	66	6,341	5.7	6.2	5.1
13,200**	63	11,976	10.8	10.0	10.9
11,000*	58	7,176	6.5	5.9	5.8
All other voltages above 11,000	147	24,425	22.0	22.2	23.5
Total reported	617	110,916	100	100	100

*Recognized as in common use by the International Electrotechnical Commission.

**Preferred for standard by United States National Committee of the International Electrotechnical Commission.

Sales of Merchandise—Table X

Table X shows the total gross receipts from sales of the merchandising departments of the electric light and power companies of the country. The grand total of $119,330,000 is nearly $20,000,000 more than the $99,866,000 reported last year. Of the total business done, 8.9 per cent was in lamps, 76.5 per cent in appliances, while the balance was in jobbing and miscellaneous electric sales. These ratios are substantially unchanged from last year.

TABLE X

GROSS SALES OF MERCHANDISE—1928

Electric lamps	$10,610,000
Electric appliances	91,960,000
All other electric sales	16,760,000
Total	$119,330,000

New Construction—Table XI

Table XI gives the distribution of actual 1928 construction expenditures and the budget for 1929, as estimated for the total electric light and power industry. These are substantially the same as in previous years. The proportion of expenditures for hydro-electric generation is showing a steady decrease from 8.7 per cent in 1927 to 8.1 per cent in 1928 and 7.5 per cent proposed for 1929.

It will be noted that the sums devoted to power plant construction comprised in 1928 about 25½ per cent of the total; for transmission lines and substations about 31 per cent; while expenditures for the distribution system took up about 28 per cent, or more than that devoted to generation.

TABLE XI

1928, 1927 AND 1926 CONSTRUCTION EXPENDITURES AND BUDGET FOR 1929 TOTAL ELECTRIC LIGHT AND POWER INDUSTRY

	1928 Gross Construction Expenditures	1929 Budget	1927 Gross Construction Expenditures	1926 Gross Construction Expenditures
Steam generating stations	$136,500,000	$160,600,000	$156,360,000	$189,058,000
Hydro generating stations	56,300,000	64,000,000	69,268,000	47,399,000
Substations	107,000,000	112,700,000	118,877,000	121,019,000
Transmission	125,100,000	147,200,000	140,573,000	115,946,000
Distribution	211,800,000	241,800,000	219,962,000	206,209,000
Miscellaneous electric	116,800,000	64,100,000	88,704,000	92,884,000
Total for electric operations	$753,500,000	$790,400,000	$793,744,000	$772,515,000

ACCOUNTING SECTION

W. R. EMERSON, *Chairman* FRED W. HERBERT, *Accounting Director, N. E. L. A.*

Machine Accounting Systems for General Books and Records

IN order to determine to what extent machine accounting systems for general office purposes, as distinguished apart from customers' billing and record keeping, have been developed in our industry, it seemed necessary to make an exhaustive survey. K. B. Crumb, Chairman of the General Records Committee of the Accounting National Section, sent a questionnaire to all member companies asking for information on this special subject. The replies from companies using machine accounting methods indicated general satisfaction, and the intention was to incorporate this survey in a serial report by this committee. The volume of detail and the varied results obtained by the companies is so diversified that it does not permit of tabulation in a report. However, this detail is on file at N. E. L. A. Headquarters and is available as to specific companies and machines.

The report in summary form is as follows:

Mechanical systems for the purposes of keeping consumers' records, preparing, addressing and postal stamping bills, which have been developed to a great extent in the past few years, are now in general use. The benefits that have resulted in reduced costs, neater records, elimination of peaks, etc., are known.

Machine accounting systems for the general books and records have not been developed to the same extent. They appear to be in the experimental stage. That systems for consumers' accounting have been perfected and are in general use, while such systems for general accounting appear to be in embryo, is, no doubt, due to the fact that general office accounting entails the use of a greater number of records and requires a variety of operations. It is, therefore, more involved for adaptation to machines. Also it is probable that the manufacturers saw a greater market for machines in the consumers' accounting field and their first efforts were naturally along this line.

Some of the larger utilities, with the aid of the manufacturers of machines, have developed machine systems that are superior to hand written methods. In order that it might be known to what extent general office machine accounting is now being used, and to awaken the interest of all accountants in the industry in this means of further reducing costs, thereby creating a demand that is bound to be recognized by the manufacturers and give stimulus to further development toward perfected systems, the member companies were solicited for information as to systems now in use.

Since nearly one-half of the member companies responded, the replies that were received are summarized below and are sufficient to indicate the trend.

Size of Company In Number of Consumers	*Machine Accounting Employed on General Books and Records* No	Yes	*Per cent Using Machine Accounting Systems*
1- 5000	79	2	2.5
5000- 10000	47	2	4.1
10000- 25000	39	9	18.7
25000- 50000	32	9	22.
50000-100000	23	17	42.5
100000-500000	12	20	62.5
Over 500000	—	6	100.
Unclassified and Holding Companies	32	13	29.
	264	78	20.

From this summary it might be assumed that mechanical accounting has merits only for the larger companies. It is true, of course, that the amount of saving varies directly with the volume of work. Nevertheless there is another factor to be considered. Most of the machine installations now in use have been adopted, not in the original instance as standard equipment of proved merit, but as results of experiments within the organization using them. Such development work is expensive, and the results at first are not certain. The larger companies being in better position to experiment are the ones employing such systems before these have become standardized.

It is apparent that as a result of such experimental work machine accounting systems of proved merit are now beginning to appear.

Wisconsin Accountants Meeting

INSTEAD of discussing merely the technical accounting aspects of the industry, the program of the convention of the Accounting Section of the Wisconsin Utilities Association held in Sheboygan, June 20 and 21, included papers, addresses and reports analyzing and setting forth the general problems of the industry.

The convention attracted about 100 delegates. A. J. Bohl, auditor of The Milwaukee Electric Railway and Light Co., was elected chairman, succeeding Louis T. Smith, J. E. Gray, auditor of the Wisconsin Power and Light Co., Madison, was elected vice-chairman.

G. W. Van Durzee, president of the Wisconsin Utilities Association, spoke on the necessity for finding out what the public wants, and conforming to those wants as far as practicable.

Howard L. Smith, certified public accountant, Madison, made a talk on "Some Differences between Municipally Owned and Privately Owned Public Utilities."

A paper by W. C. Beckjord, vice-president and engineer of the American Light and Traction Co., asserted that more workable contacts between engineers and accountants should be developed for the purpose of joint understanding of mutual problems and the elimination of the outstanding points of difference between accountants and engineers.

A. J. Bohl, auditor, the Milwaukee Electric Railway and Light Co., Spoke on the subjects of "Depreciation and Replacements."

G. C. Methews, Director of the Statistical Securities Division of the Wisconsin Railroad Commission, spoke on "Recent Tendencies in Utility Consolidations."

K. R. Boyes, secretary of the American Gas Association, stated that there are probably better and more educational facilities in the United States available to the working man than in all the other countries of the world. The speaker stressed the importance of training understudies to fill vacancies within the organization when they occur, declaring it is a reflection on the company's manager when he goes outside to seek a man to fill a vacancy.

C. E. Kohlhepp, Treasurer of the Wisconsin Public Service Corporation, Milwaukee, speaking on taxation, asserted that utilities in general in Wisconsin are paying a greater amount of their net income in taxes than utilities in surrounding states. Utilities in Wisconsin are paying approximately 34 per cent of their net in taxes, and the industries in Wisconsin are paying about 21 per cent, indicating clearly, he said, that utilities are now paying higher taxes than other industries and that the proposals in the legislature to further increase utility taxes by approximately $1,300,000 are unjustified.

Other speakers and their subjects were: "Gas Rates and Ratemaking," Ewald Haase, Milwaukee; "Some Problems of the Classification of Accounts," John Dockendorf, Milwaukee; "Field Accounting on Construction of High Pressure Gas Transmission Lines," John I. Allen, Racine; "Methods of Handling Customer's Request for Service," Paul A. Hoffman, Milwaukee.

ENGINEERING SECTION

Alex. D. Bailey, *Chairman* **H. S. Bennion**, *Director of Engineering, N. E. L. A.*

Electrical Apparatus Committee Meeting

By T. G. Le Claire

Vice-Chairman Publication Sub-committee

THE Electrical Apparatus Committee held its final meeting for the administrative year on May 2 and 3 at Asbury Park, N. J. Chairman of the Committee, J. Allen Johnson, presided at these meetings. The program was a large one, devoted to rounding out the business of the year. The topics handled can be briefly summarized as follows:

Hydrogen Cooling for Machinery

The Generating Station Subcommittee, of which C. A. Harrington is the Chairman, presented a symposium on the use of hydrogen as a cooling medium for rotating electrical machinery. According to the speakers of this symposium, hydrogen cooling has the following advantages over air cooling:

1. Lower operating temperature
2. Decreased windage loss
3. No fire hazard
4. Increased life of insulation
5. Decreased corona damage
6. Quieter operation.

The early machines built for hydrogen cooling were made explosion-proof so that, should an explosive mixture of hydrogen and air be ignited within the machine, the shell would not be wrecked. Some of the newer machines are, however, not built explosion-proof, and greater attention is paid to keeping the concentration of hydrogen outside the explosive limit, which is between 10 per cent and 70 per cent by volume. Several machines have recently been built for hydrogen cooling, including a 12,500 kv-a. synchronous condenser and a 62,000 kv-a. generator.

With the use of hydrogen at approximately atmospheric pressure as the cooling medium in the machine, the rating of a synchronous condenser is increased approximately 25 per cent over that of the corresponding machine with air for cooling. If the pressure of this hydrogen is raised to 15 lb. per sq. in., the rating of the machine can be increased another 30 per cent over the corresponding rating with the hydrogen at atmospheric pressure. The consensus of opinion is that for high speed synchronous condensers, where it is not necessary to seal a rotating shaft, the cost of applying the hydrogen cooling is less than the value of the additional rating obtained on the machine. This advantage is further augmented by the fact that the hydrogen-cooled machine, being totally inclosed, can be installed out-of-doors, and the cost of inclosing building is thereby saved.

For machines such as turbo-alternators where a rotating seal must be maintained, the additional cost of this sealing and the supply of hydrogen to compensate for leakage makes the economy of the hydrogen over air cooling less apparent. Development work is rapidly going forward, and these machines will undoubtedly be much improved in the near future.

Neutral Grounding Impedances

The Generating Station Subcommittee also presented a discussion on neutral grounding impedances. Speakers having different types of systems presented the features of various grounding practices.

System Operation

The Operating Practice Subcommittee, of which P. B. Juhnke is Chairman, presented a symposium on the operation of typical high-voltage systems. The Public Service Electric & Gas Company uses a 132 kv. transmission system, which is at present divided into two parts, one of which is tied in with the 220 kv. system of the Peoples Power & Light Company and the Philadelphia Electric Company, and the other half is interconnected with the Philadelphia Electric Company, Delaware Station. The transmission lines are double circuit, using balanced relays which are backed up by overload relays with a long-time setting.

The Southeastern Power & Light Company system consists of a large number of relatively small stations scattered over a wide area and connected to a complicated network of transmission lines. Most of these lines consist of double circuits at 110 kv. protected by differential relays. The single circuit lines are protected by directional relays. Frequency on this system is automatically controlled within 1/20 cycle by the automatic governing of 60,000 kw. in generating capacity with load variations of 15,000 plus or minus.

The Commonwealth Edison Company system consists of five stations, very close together and interconnected by 66,000 volt lines. These high-voltage underground lines are protected by pilot wire relays.

On one 132 kv. system, which is not protected by lightning arresters there were no interruptions due to lightning, while on another system during the past year there has been one line opening for every three miles of circuit.

Several interesting cases of system trouble were discussed. On one system it was found that 35 per cent of line trouble involving parallel circuits caused the interruptions of both the circuits, but that ordinarily one can be restored very promptly.

Standardization

Several interesting speakers gave a general discussion on the various aspects of standardization. Their discussion can briefly be summarized as follows:

Probably the most important types of standards are those of quality, which serve as a basis for accurate commercial comparison of products supplied by different manufacturers. Standards of performance rating might be considered in this class. For electrical equipment the most fundamental standards are those of characteristics, such as voltage, frequency and the like.

Simplification standards have for their purpose the fixing of a few sizes which will reduce the number of different items to be manufactured and carried in stock. These simplification standards reduce manufacturing costs by making for quantity production. The effect of these simplification standards is that each article in itself is probably better built and cheaper than it would otherwise be, but is not so closely adapted for the individual application as would be a special design.

Codes, such as the fire code, the safety code and the like, involve large numbers of people and many diverse interests. They must be very carefully considered before being put into effect, since they are of quasi-legal type and once established are difficult to keep in step with technical developments.

Standards are intended to make for progress, and it should, therefore, be understood that standards must be flexible and subject to change. The standard is desirable for reducing costs, but it would be very undesirable if it persisted in use after later developments make new practices more desirable.

Utilization Voltages

The Utilization Subcommittee, of which L. B. Bonnett is Chairman, has reconsidered the question of utilization voltages since the Memphis meeting. The report of the Lamp Committee for 1928 indicates that nearly half of the lamps purchased were for 115 volts and over one-third for 120 volts, but that very few were purchased for 110 volts. Comparison of the figures for 1927 and 1928 indicates a slight decrease in the percentage of sales of 115 volt lamps and a corresponding increase in that of 120 volt lamps. It was brought out in discussion that immediate redesign of appliances and small motors was neither desirable nor necessary.

Currents and Voltages That Do Not Register on the Watt-Hour Meter Being Measured by Joint Committee

THE perfection of almost any of man's endeavors is dependent on the development of standards of measurement and ready means for measuring the unit quantities involved. The earliest history of man in regard to his trade relations tells of the barter between individuals in the trade of the goods that one possesses for the goods that another possesses. As trade developed mediums of exchange were established, with which the values of various goods could be measured. These mediums of exchange were first local in the form of beads, shells and various other trinkets. Later they developed a national character, and now gold as a measure of economic value is almost universally accepted throughout the civilized world.

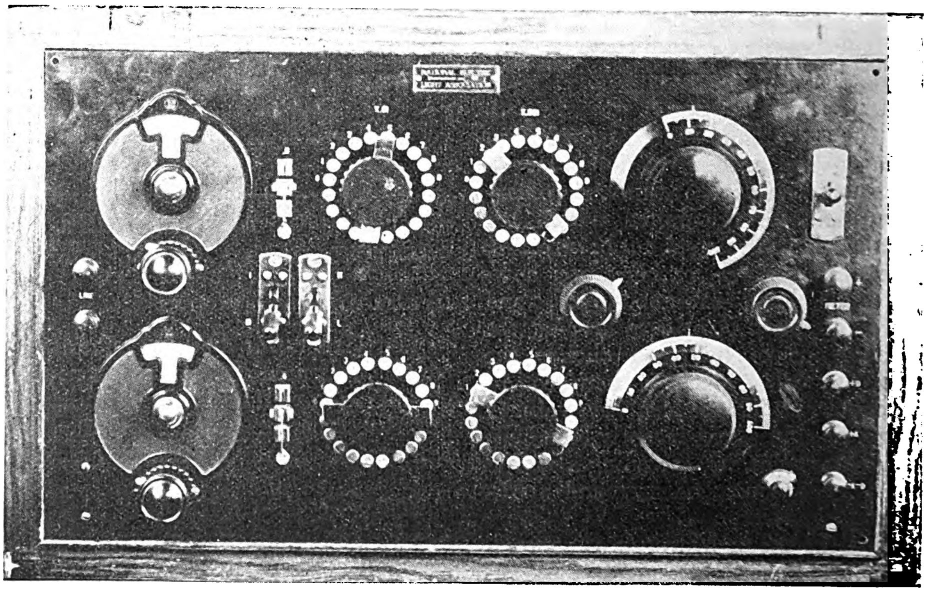
Dependence Upon Measurements

The development of any science or art can be traced with the development of its associated measurements. The Meter Bar preserved in Paris by the French Government is universally accepted as a basis for measurements by most of the civilized world. However, men worked for a long time before this single standard of length was evolved. The first central station for the generation of electrical energy did not possess any meters with which it could measure the amount of its product that was delivered to the various customers. Therefore, it was necessary to base their charges on the number of lights connected to the circuit with little regard to the time each light was burned. The same method was later used in the charge for fan service. Today the revenue of the central station industry is almost entirely dependent on the measurements of watts, volts and amperes on accurate low-priced instruments. We could not conceive of the present central station industry operating without the little watthour meter for every customer.

In 1922, when the Principles and Practices Subcommittee prepared their report for the guidance of the telephone and power industry in their mutual relations, they recognized that the susceptiveness of the telephone circuits, coupling between power and telephone circuits and influence of the power circuits were the three fundamental physical factors involved. However, there were no means available for the ready measurement of many of these factors, and it has required considerable time to determine the exact quantities which should be used as a basis for measuring these factors, and also for the development of measuring equipment which could be used outside of the laboratory for their determination.

Harmonic Analyzers Developed

The influence of the power system is largely dependent upon the arrangement of the conductors and the magnitudes and frequencies of the various harmonic currents and voltages present. The oscillograph was used in the early days of the development of the art of inductive coordination for the determination of the harmonics present in a given current or voltage wave. This instrument had very serious limitations for these determinations. A 1 per cent harmonic of 900 cycles has far more influence on telephone circuits than a 10 per cent harmonic at 180 cycles. However, the oscillograph would clearly show the latter, and the former would be almost entirely lost. To meet this situation numerous means were devised for measuring directly the harmonic currents present in an electrical circuit. Under the direction of the Joint D & R Subcommittee, several harmonic analyzers* have been developed to be used in connection with its work. Each of these has proved of aid in the solution of the various problems. A small portable analyzer,** which has sacrificed accuracy to a slight extent for portability



Harmonic Analyzer Used in Connection with Wave Shape Survey and ease of operation, has provided a means for measuring the harmonic currents and voltages in a large number of power systems.

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* AIEE Journal, June 1929.
** NELA Serial Report No. 278-22.

Project Committee No. 5[†] was assigned the task of determining the wave shapes of various types of transmission and distribution circuits throughout the country. It was also assigned the task of determining the effect of various types of rotating apparatus and various types of transformers upon the wave shape. After developing a means for measuring the harmonic currents and voltages, the next problem was the efficient use of this apparatus to obtain a cross-section of the conditions existing throughout the country in a reasonable time and with reasonable accuracy. In order to accomplish this, a survey of the major power systems in the eastern part of the United States was embarked upon. The personnel available to the D & R Committee was extremely limited, and if all measurements were to be made by their own personnel several years would be required to obtain the necessary results. The Project Committee decided to conduct this survey, using its own personnel to lay out programs of measurements and to educate power company personnel to use the apparatus and make the necessary measurements. Wonderful cooperation has been received from a large number of companies, and in about one year's time data have been collected which will show the average conditions prevailing, as well as the maximum and minimum conditions encountered.

Field Work

A little over a year ago The Philadelphia Electric Company was approached, the plans of the Project Committee explained in detail and their cooperation secured. This gave an opportunity to use the equipment in the making of all the necessary field measurements on a large transmission and distribution system. In this case the entire program was carried out with the assistance of Headquarters engineers. The report giving the results of this survey was then sent to a number of power companies in order to show the types of measurements that were required, and the results that the committee desired to obtain for each system.

Wave Shape surveys have been completed on the following power systems:

Philadelphia Electric Company
Georgia Power Company
Public Service Electric & Gas Co.
Connecticut Light & Power Co.
Edison Electric Illuminating Co. of Boston
Niagara Falls Power Company
Cumberland County Power & Light Co.
Central Maine Power Company
Hartford Electric Light Co.
Virginia Electric & Power Co.
New Orleans Public Service, Inc.
Memphis Power & Light Company
Oklahoma Gas & Electric Co.
Texas Power & Light Co.
Dallas Power & Light Co.
Kansas City Power & Light Co.
Union Electric Light & Power Co.
West Texas Utilities Company
Southwestern Gas & Electric Co.
Gulf States Utilities Co.
Birmingham Electric Co.
Houston Lighting & Power Co.
Appalachian Electric Power Co.
Carolina Power & Light Co.
Louisville Gas & Electric Co.
Kentucky Utilities Co.
Potomac Electric Power Co.
Pennsylvania Power & Light Co.

In addition the following companies have also signified their willingness to cooperate with the Project Committee in its work:

Utah Power & Light Co.
Puget Sound Power & Light Co.
Consumers Power Company
Toledo Edison Company

The committee expects to secure the cooperation of several additional companies. As soon as this work is completed it is believed that sufficient information will be available to form a basis for determining the conditions, as far as wave shape is concerned, that will be encountered throughout the country. This information will form the basis for the development of more specific principles and practices. It will also materially assist in the solution of specific problems of noise induction between power and communication circuits, since these data will transfer one of the major factors from the column of unknown and assumed quantities to the column of known quantities. Fairly definite values of noise, therefore, can be estimated, and it will be much easier to construct transmission and telephone circuits without considerable misgiving on the part of the interested engineers as to the results to be obtained. Power companies will also know whether a new generator of a given wave shape will increase or decrease the inductive influence of their system. Similarly with any new type of apparatus, it will be possible to determine, before the apparatus is purchased, whether or not our problem of inductive coordination will increase or decrease with its use.

FIRST AID IN ADELAIDE

The gospel of First Aid is being spread in far off Australia through a member company who finds it convenient and economical to have N. E. L. A. Headquarters supply it with 150 illustrated charts of Resuscitation by the Prone Pressure Method. This chart (Publication No. 289-41) recently has been revised by the Accident Prevention Committee.

This Australian member company is the Adelaide Electric Supply Company of Adelaide, capital of South Australia.

Interchangeability of Insulating Oil

THE Westinghouse and the General Electric companies have agreed to the interchange of WEMCO-C and GE-1OC oils in circuit breakers as well as in transformers when supplied by approved refiners, with certain reservations in the case of oil circuit breakers. The General Electric Company will approve the use of WEMCO-C in circuit breakers having separate chambers, gasketed tanks and other non-oil throwing features with the understanding that WEMCO-C oil as regularly supplied by the Westinghouse Company has characteristics essentially the same as General Electric 10-C and that their specifications and supervision compare favorably with those under which General Electric 10-C is supplied. The Westinghouse Company will approve the use of General Electric 10-C oil in all oil circuit breakers provided that the General Electric 10-C is furnished by approved refiners.

The General Electric Company has announced that they will permit the use of 10-C oil in both their transformers and in oil circuit breakers of modern design equipped with non-oil throwing features, the only exception being that the lighter 10-C transformer oil is not recommended for use in old types of breakers which are not equipped with non-oil throwing features. The types of breakers in which 10-C oil may be used include types K-37, K-55, K-58, K-136, K-139, K-330 and all "H" types.

The Westinghouse Company has permitted the use of WEMCO-C oil in both their transformers and oil circuit breakers, indoor and outdoor types, since 1927.

Public Utility Points

THE ninth edition of "Public Utility Points," a 16-page pamphlet published by Bonbright & Co., 25 Nassau Street, New York, is now ready for distribution, and this company advises that copies up to 100 in number will be mailed free of charge to applicants. For pamphlets in excess of that number a charge of 3½ cents per copy will be made. Such topics as the accomplishments of the electric light and power industry, future possibilities, public and private ownership and statistics on the public utilities are discussed in the booklet.

[†] Of the Joint Subcommittee on Development and Research of the Bell Telephone System and the National Electric Light Association.

GEOGRAPHIC DIVISIONS and STATE ASSOCIATIONS

North Central Electric Association Convention

MOVIETONES featured the Golden Jubilee of Light Convention of the North Central Electric Association at Breezy Point Summer Resort, Pequot, Mich., June 16-17-18, 1929. Matthew S. Sloan, President-elect of the National Electric Light Association, delivered an address to the convention through the medium of the talking-moving picture as a substitute for his personal attendance. It was very well received and perfectly coordinated. Talking movies of Thos. A. Edison, and Sir Ernest Benn, London publisher, were also shown.

L. M. Pharis, President of the North Central Electric Association, gave a detailed report of the past activities of the N.C.E.A. He mentioned as the most significant development the large attendance at the Group conferences of the Accounting, Commercial and Engineering Sections. This point of view was emphasized by the Chairmen of the respective Sections—C. J. Strike, Huron, S. D., Chairman Commercial Section; J. A. Colvin, Minneapolis, Minn., Chairman Engineering Section, and W. S. Hodgson, Duluth, Minn., Chairman Accounting Section.

O. S. Powell, Federal Reserve Bank, Minneapolis, gave an interesting picture of the Northwest business developments and stated that this section was improving more rapidly than most of the country at the present time.

W. H. Rademacker, Edison Lamp Works, Chicago, presented detailed plans for celebrating the Golden Jubilee of Light in each local community.

C. W. McDonnell, Chairman of the Board of Railroad Commissioners, Bismarck, N. D., spoke of the problems confronting regulatory bodies.

One of the outstanding talks of the convention was an illustrated talk by T. D. Crocker, Northern States Power Co., Minneapolis, on "Trading Places with Ontario." Mr. Crocker compared the conditions existing in Minnesota with the Ontario Hydro-Commission plant and showed by well worked out figures that if Ontario had the same water conditions as Minnesota, Ontario rates would have to be twice as high.

The five Group Conferences on the morning of June 18, were very successful. In the Engineering Conference, "Radio Interference" was given considerable attention. The speakers thereon were: L. A. Grettum, Winona, Minn.; R. A. Farmer, Minneapolis, Minn.; B. H. Clingerman, Minneapolis, Minn.; A. S. King, Fargo, N. D., and F. S. Rice, Duluth, Minn.

W. H. Brown, Minneapolis, led the discussion on "Accident Prevention," C. W. Place, Electrical Engineer, General Electric Co., Chicago, talked on "New Engineering Developments."

The outstanding talk of the Commercial Section was "Fundamentals of Store Management," by W. E. Koch, Business Counselor, Kansas City, Mo.; R. R. Herrmann, University of Minnesota, Minneapolis, gave an interesting presentation of the effects of Promotional Rates on water heating.

The Women's Section, under the direction of Mrs. Mabel Wilson, had the following program: "Debunking the Housekeeping Martyr," Miss Eloise Davison, N. E. L. A., New York City; "Organization Problems," Miss Mae Brooker, Dubuque, Iowa; "Past Activities," Miss Lillian Swanson, Huron, S. D. There was also a round table discussion on "Company Service," led by Miss Columbia Tielebein, Mitchell, S. D., and Mrs. Claire Harley, St. Paul, Minn.

Excellent talks were given by Paul S. Clapp, Managing Director of the N.E.L.A.; Fred Herbert, Service Director, N.E.L.A.; Miss Isabell Davie and Miss Eloise Davison of the Women's Department of the N.E.L.A.; and Major H. S. Bennion of the Engineering Department.

Monday and Tuesday afternoons were spent in athletic and social diversions, with more than 100 playing golf. W. S. Heald, sales manager, Minnesota Power & Light Co., Duluth, Minn., acted as toastmaster at the banquet Tuesday night, and distributed the 40 or more prizes for convention stunts.

The speaker of the evening was Dr. J. T. E. Dinwoodie, editor of *The Dakota Farmer,* Aberdeen, S. D., whose subject was "How a Newspaper Man Looks at the Electrical Industry." Dr. Dinwoodie stated that in his judgment the electrical industry had not really started, and he was expecting a great deal from the industry in the future.

A masquerade party was held on Monday evening, and a Specialty Dance on Tuesday evening. The dances were named after the different jobbers and manufacturers who presented stunts and prizes during their dance.

The weather was delightful during the entire convention, and about 350 were in attendance.

The new officers elected were:

Thomas T. Parker, Northwestern **Public Service Co., Huron,** S. D., President; **B. W. Cowperthwait,** Northern States Power **Co., Fairbault, Minn.,** Vice-President; **J. A. Hennessy, Northern** States Power Co., **Minneapolis, Minn., Treasurer;** T. D. **Crocker, Northern States** Power Co., **Minneapolis, Minn.; W. S. Heald,** Minnesota Power **& Light Co., Duluth,** Minn.; **C. S. Kennedy, Otter Tail** Power Co., Fergus Falls, **Minn.; Frank Milholland,** General West **Public Service Co., Omaha,** Neb.; George E. **Taylor, Interstate** Power Co., Dubuque, Iowa.

Missouri Association Convention

MEETING for business in the mornings only — an innovation that proved popular—the Missouri Association of Public Utilities held its twenty-third annual convention at Sedalia on May 16 to 18. President A. E. Reynolds presided. It proved an entirely successful and interesting gathering, with a well-balanced program and 200 in attendance. A special committee was authorized to cooperate in the celebration of "Light's Golden Jubilee," following an address on that subject by R. B. Obermeyer of Kansas City.

One of the principal addresses concerning the electrical industry was made by Walter E. Bryan, superintendent of power for the St. Louis Public Service Company—an electric railway utility. Mr. Bryan's subject was, "The Largest Individual Power Consumer," meaning the street railway, and he pointed to the value of the latter to the power company because of its purchase of 25-cycle power, thereby enabling the power company to keep equipment in service which would otherwise have to be shut down and the loss borne by light and power customers.

Mr. Bryan's address was followed by an open forum at which various subjects were discussed informally.

At Friday's session G. W. Weston of Kansas City spoke on the national "red seal" plan, declaring that the real problem is to get the great mass of homes adequately wired—a problem which, he suggested, could be met by cooperation with builders of low-priced houses.

At the annual banquet and carnival E. E. E. McJimsey, associate editor of the Springfield *Daily News,* discussed the advantages of a close cooperation and mutual understanding between public utilities and the public press.

Officers elected are: President, **T. J. Strickler, Kansas City** Gas Company; **first vice-president, E. D. V.** Dickey, **Hannibal; second vice-president, H.** Patton, St. Louis; **third vice-president, A. E.** Bettis, **Kansas City; secretary, F. D. Beardslee (reelected); treasurer, Herman Spoehrer.**

WOMEN'S COMMITTEE

Miss Sophia Malicki, *Chairman* **Miss Isabell Davie**, *Secretary*

News Letter

By Mrs. Thelma Van Ness

MEMBERS of the Women's Committee, Home Service Subcommittee and Manufacturers Subcommittee from all over the United States attended the recent meetings for these groups, held in connection with the N. E. L. A. Convention at Atlantic City June 3 to 7. Although most of the women came from the eastern half of the country, nevertheless the Pacific Coast, Northwest and Southwestern Divisions sent representatives who contributed their share to the meetings.

The National Women's Committee, the Home Service Subcommittee and the Manufacturers Subcommittee each convened for separate meetings at 9:30 Monday morning, June 3, and joined for a short meeting at 10:30 o'clock.

The open meeting for women was held in the Garden Lounge, Dennis Hotel, Monday afternoon, June 3, at 3 o'clock. This meeting was presided over by Miss Sophia Malicki, Chairman, Women's Committee, and was addressed by speakers of various interests.

Miss Ada Bessie Swann, Chairman, Home Service Committee, told of the efforts of her Committee during the past year, and made recommendations for future work.

A talk by Miss Fern Snider, Monongahela West-Penn Public Service Company, Fairmont, W. Va., concerning Home Service, brought out many interesting points, chief of which was the plea that future Home Service work be forwarded on a broad scale covering all possible applications of electricity to homemaking.

Miss Frances Weedman, Edison Electric Appliance Co., Chicago, Chairman, Manufacturers Subcommittee, discussed the plans for this group. A collection of educational material available from manufacturers of electrical household equipment has been made by her Committee. Information concerning it can be procured from her.

A discussion of the Short Courses for women in the electrical industry, which have been held and are now contemplated by colleges and universities, was given by Miss Eloise Davison, Home Economics Advisor, National Electric Light Association.

Mrs. Sarai Waugh, Westchester Lighting Company, Mount Vernon, N. Y., told of the activities of Home Lighting Specialists and urged that home lighting be not slighted in the programs of Home Service departments and Women's Committees.

The plans for "Light's Golden Jubilee" were presented by Miss Sara Harris, Utica Gas & Electric Company, Utica, N. Y.

Miss Mary L. Johnston, National Federation of Business and Professional Women's Clubs, a guest of the Women's Committee to the Convention, explained the purposes and work of the Federation.

A talk of especial interest to all present was made by Mrs. Charles E. Gregory, Educational Director, Home Center, New York Federation of Women's Clubs, in which she told of the planning and building of the Permanent Home Making Center which was recently opened. Mrs. Gregory stated that this is the first time that a large institution has been set up as a definite place for the all-around study of home and home problems, where a continuous program of information and instruction is carried on. Mrs. Gregory extended an invitation to all members of the Women's Committee to visit the Home Center.

A brief talk on an international movement for the betterment of homes was made by Miss Dorothy Dignam, who has just returned from abroad.

Miss Isabell Davie told of the uses being made of the "More Power to the Home!" booklets by Women's Committees, Home Service Directors, Commercial Managers and others. She reported that about 150,000 of the booklets had been distributed.

* * *

Miss Sophia Malicki, Chairman of the Women's Committee, and Miss Helen Norris, Member-at-Large of the Women's Committee, will attend a meeting of the Electrical Association for Women at Newcastle-on-Tyne, England, in July. Miss Malicki, who is affiliated with the Middle West Utilities Company, Chicago, will speak on "The Modern Development of Electricity As It Affects Women." Miss Norris is Dean of Women of the Commonwealth Edison Company, Chicago.

* * *

Mrs. Hazel Roberts of the Wabash Valley Electric Company won the highest honors in the prize essay contest conducted by the Middle West Utilities Company in 1928, according to a late issue of *Power News* published in Indianapolis by the Interstate Public Service Company and the operating subsidiaries of the Central Indiana Power Company. A District, a Company, and a President's prize were offered for the best papers by employees on the subject, "What Our 1928 Public Relations Program Has Meant to Me." Mrs. Roberts of Clinton, Ind., who is secretary to C. M. Poor, Vice-President and General Manager of the Wabash Valley Electric Company, won all three prizes. The President's prize, given for the best paper written by an employee of any of the companies controlled by the Middle West Utilities Company, which operates in 29 states, was a trip to the National Electric Light Association Convention in Atlantic City this year. The Company prize is a trip to the convention of the Great Lakes Division at French Lick, Ind., in September. The District prize was $15 cash.

* * *

The Women's Committee of the Iowa-Nebraska Light & Power Company presented a skit entitled "Live and Help Live," by the girls' First Aid Team at the Middle West Division, N. E. L. A. Convention at Omaha recently. Members of the team are Miss Lydia Hild, Miss Vera Field of York and Miss Ellen Curran of Lincoln. The *Live Wire Newsette* is the name of the interesting little bulletin published by this group.

* * *

From a report of safety activities of the Southeastern Division Women's Safety Subcommittee, Miss Selma R. Cohn, Chairman, we learn that some exceptional work was done by the women following the hurricane at West Palm Beach. The women worked unceasingly to relieve suffering, assisting in the work of the First Aid Station established by the Florida Power & Light Company at its power plant. They also procured clothing and distributed it among members of employees' families. Miss Fletcher, in charge of the station, was given authority by the Red Cross to administer typhoid vaccine to company employees and hundreds of others in the city. Later, she was awarded a medal for giving her blood in a transfusion to the wife of an employee.

* * *

Mrs. Jane Pratt, Chairman of the Southeastern Division Women's Committee, reported that in the recent floods in the Southeastern states the utility women responded to an appeal which she made over the radio for food, clothing and money, in a manner which far exceeded expectations. Stations for collecting these donations were immediately established, and in less than 24 hours large shipments were on their way to the flooded section. These came from the larger communities. All of this work was done on Saturday and Sunday. Furthermore, the utility women contacted with the other women in their localities, through their club memberships, and started a movement among these women with like results.

* * *

Miss Esther Rockey, Chairman of the East Central Division, reports that the Women's Committee held regular sessions in connection with the Division Convention in Louisville beginning May 7. Miss Rockey sends out some very interesting letters to the local chairmen in her division as a means of stimulating interest in committee work.

* * *

The Women's Committee, Portland Electric Power Company, Portland, Ore., of which Miss Marguerite Butler is Chairman, entered six women in the Company Public Speaking Contest. There were twenty-one men contestants. Of the twelve persons receiving the highest rating, the women took first, second, third and eighth places. Two separate sets of judges graded the manuscripts and the delivery. Mrs. Gladys Robison won the first prize and will therefore represent the company at the convention in Seattle in June, at which she will compete with the winners from the other Northwest companies. Miss Louise Espey took second place; Miss Oleva Murphy, third, and Miss Alice Butz eighth.

* * *

In the Women's Committee Essay Contest of the Portland Electric Power Company, the subject of which was, "Pleasing Mr. and Mrs. Public," first prize was awarded to Miss Margaret Brady, second to Mrs. Coralyn Cathcart, third to Miss Margaret E. Fuller and the fourth to Mrs. Gladys Robison. Honorable mention was awarded to Miss Edna Harlocker and Mrs. Grace Parke. Twenty-two papers were submitted. Miss Brady's paper will be sent to the Chairman of the Women's Committee, Northwest Division, to be entered in competition with the winning papers from the other Northwest companies.

* * *

The Western District Women's Committee, Puget Sound Power & Light Company, made quite a record in a recent essay contest, every girl except one having submitted a paper. Miss Grace Morgan was awarded the $10 first prize.

* * *

According to the Women's Page of *Current Topics,* Miss Betty Ewing, editor, the First Aid class of the Topeka Women's Committee, the Kansas Power & Light Company, has been completed. Cash prizes were awarded by D. E. Ackers to the two teams giving the best demonstrations of the prone pressure method of resuscitation. The team winning first prize was captained by Miss Garnette Reynolds and the second prize team by Miss Dorothy Myer. First and second prizes were also awarded to Miss Nancy Potter and Miss Doris Armstrong respectively for the best first aid note books out of thirty-four entrants. Miss Elsie McMann is the State Chairman of Kansas.

* * *

The Illinois Power & Light Corporation Women's Committee at Granite City recently presented the playlet "How Jane Found Happiness" before the Matrons' Literary Club of Madison, Ill. The club's topic of the discussion for the meeting was "The Modern Home" and the playlet proved very appropriate for the occasion.

* * *

The Michigan Women's Committee Chairman, Miss Skulda Baner, of the Lake Superior District Power Company, Ironwood, spoke before the Ironwood Women's Club meeting in April, and also was one of the speakers at the annual Upper Peninsula District Federation of Women's Clubs convention at Negaunee, Mich., in May. At the Ironwood meeting Miss Baner selected "Color" as her topic of discussion and at Negaunee she spoke under the auspices of the American Home Department, on subjects pertaining to the beautifying of the home.

* * *

The Bulletin *Woco Sayso,* published by the Women's Committee of the Public Service Company of Colorado, has been incorporated in the new company magazine just issued by that organization. Miss Lorraine Anderson is the editor of the Women's Committee page, assisted by Miss Ruth Kraft.

MAGAZINE ARTICLES

Below is a list of articles which appeared in various magazines recently that are especially interesting to Women's Committee members:

The House Beautiful—June
- Lighting the Grounds—Fletcher Steele

House and Garden—June
- Progress with the Home Laundry—Elizabeth Hallam Bohn

Woman's Home Companion—June
- The Work of the World—Isabel Ely Lord
- Community Housecleaning — Anna Steese Richardson

Good Housekeeping—June
- Getting Good Refrigeration—Arthur J. Donniez

Delineator—June
- How To Launder Your Summer Wardrobe
- Color and Efficiency in the Kitchen

The Household Magazine—July
- The Home Plant Modernized—J. P. Martin

The American Home—July
- New Telephones and Cabinets—Vandy Cape

* * *

Oklahoma won the cup in the Efficiency Contest this year, which was conducted by the Southwestern Geographic Division, N. E. L. A. There were six points to the contest, as follows: Monthly Meetings, Attendance, Sale of Stock, Sale of Appliances, Public Contacts and Safety or First Aid Work. All committees, through the State Chairmen, reported monthly to the Division Chairman on the State Efficiency Cards. These cards were checked and all points figured from Oct. 1, 1928, to March 1, 1929. Miss Julie Pailet is the capable Chairman of this Division.

* * *

The Women's Committee of the Pacific Coast Electrical Association is publishing a bulletin—and it is a very clever little four-page pamphlet. All it lacks is a name, and the girls are anxiously searching for something appropriate. Mrs. Ruth E. Creveling is in charge of this Committee's activities.

* * *

Be sure to read all the splendid articles and news of other Committees in this issue of the N. E. L. A. Bulletin.

SPECIAL COMMITTEES

Growth of Street Lighting[*]

Street lighting is advancing at a rate which falls far below the increasing requirements of high speed traffic. Nevertheless there is some advance.

The Lamp Committee report for 1929 shows that the average lumens output of street series lamps for 1928 was 5.6 per cent higher than for 1927. This is one indication of the rate of advance.

Another indication is afforded by statistics of two central stations—one in the East and one in the Middle West—which show increases in recent years in kilowatt-hours sold for street lighting. These data are as follows:

	Increase in kw-hr. over those for 1922	
Year	*Eastern Co.*	*Middle Western Co.*
1923.......	10%	7%
1924.......	25%	9%
1925.......	40%	11%
1926.......	60%	15%
1927.......	76%	33%
1928.......	95%	83%

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[*] Article submitted by Lamp Committee, Frank W. Smith, Chairman.

RELATED and other ORGANIZATIONS

Reorganization of American Committee, World Power Conference

DURING the last year the American Section of the World Power Conference has been reorganized on a permanent basis, and on July 1st will establish a permanent office and staff.

For some time it had been the opinion of many members of the Committee that if the United States is to take an appropriate part in the activities of the Conference, and if the American section is to serve adequately the international interests of the various branches of the power industry of the United States, a more permanent and effective organization would be necessary. Accordingly, on April 23, 1929, a group of individuals, representing the most important power, industrial and banking groups in the international field, were called together in New York to discuss the desirability of establishing permanent offices and staff, and the practicability of financing the undertaking. It was the unanimous conclusion that such an organization would be of undoubted value and that adequate financial support could be provided if Mr. O. C. Merrill, who had served as Chairman of the Committee since its organization in 1923, would be willing to resign his position as Executive Secretary of the Federal Power Commission and give his whole time to the work of the American Section.

Financial Support Guaranteed

On his agreement to do so, the necessary financial support was guaranteed for a period of five years, and permanent offices will be opened in Washington on July 1st. After the organization is under way and plans for participation in the Tokyo and Berlin Meetings have been completed, offices will likewise be opened in New York.

The permanent organization will have four specific objects in view: First; a more effective participation in the International sessions of the Conference. Since the meeting of 1924 in London, the American Committee has taken a comparatively small part in the several meetings of the Conference, due in part to the fact that no definite decision had been reached to organize for permanent membership in the Conference, and in part to the fact that the amount of time required for effective participation was more than could be given on a voluntary basis such as has hitherto existed. With a permanent office and staff better selection can be made of subjects and of authors, and there will be more certainty of representation at meetings of the International Executive Council. It will be particularly desirable to make adequate preparation for the Berlin meeting of 1930, which is likely to be the most important session of the Conference yet held.

Distributing Agency for Information

Second: To serve as an agency for collecting and distributing information on matters relating to power from the technical, statistical, economic, financial and legal standpoints. This will be done through organizing an interchange service with the National Committees of the forty-six participating countries. The permanent staff will also maintain close contact with the Bureau of Foreign and Domestic Commerce and will endeavor to assist that Bureau in making its information service of great value to the power industry. It is expected that this general service of information will later be enlarged by general or special investigations in foreign countries and by visits to those countries of members of the staff, thereby keeping interested persons and groups in the United States in touch with developments abroad.

Contacts with Other Countries

Third: The reorganized Committee should act as the medium through which the power industry of the United States makes its international contacts with similar foreign organizations. Since proposals are constantly arising for international organization of activities relating directly, or indirectly, to the power industry, it seems desirable that to the extent the United States participates in these organizations it should do so through the American Section of the World Power Conference.

Fourth: The Committee will act as a distributing agent in the United States of the Transactions of the various sessions of the Conferences and of any other publications that may be produced under the auspices of the International Executive Council. By handling all orders in a single consignment the minimum cost of transportation to the United States will be secured, and by importing in the name of the Committee customs duties are remitted and the inconveniences of individual customs declarations and clearance are avoided.

The first meeting of the World Power Conference was held in London in 1924. There were 1700 delegates in attendance, about 150 of whom were from the United States, and 39 countries were represented. This Conference dealt with the extent and character of power resources of the several countries and the degree to which they had been utilized; with the technical features of power production by water and by fuel, and of power transmission and distribution; with preparation of fuels and the design of prime movers; with utilization of electric energy in electrochemistry, electro-metallurgy, transportation, and for general industrial and domestic purposes; and with the social, economic, financial and legal aspects of power development and use.

The first meeting at London was a "plenary" session for which equal responsibility was taken by all participating countries. In addition "sectional" meetings have been organized on a more limited basis and with a more restricted program. One at Basle, Switzerland, in 1926, dealt with the physical relations between water power and navigation and the economic relations between water power and steam power; with international exchange of electric energy; with the use of electricity in agriculture; and with railroad electrification. A meeting in London in 1928 was devoted exclusively to fuel problems; such as cleaning, drying, briquetting and storage of solid fuels; composition, classification, preparation, storage and handling of liquid fuels, high and low temperature carbonization; and the utilization of solid and liquid fuels, gas and electricity for domestic purposes and in industry. A third European "sectional" meeting, confined wholly to water power, has just ended its sessions in Barcelona. A fourth "sectional" meeting will be held in Tokyo in October of this year in connection with the sessions in that City of the World Engineering Congress.

Countries Represented

The Constitution of the World Power Conference provides that it shall be constituted of the National Committees of the several participating countries and that the management of its affairs shall be vested in an International Executive Council, which shall act as the instrumentality for carrying into effect the policies initiated by the respective National Committees. Each participating country has one vote in the International Executive Council.

The following forty-six countries are now represented on the Council:

Australian Commonwealth
Austria
Belgium
Brazil
British Guiana

Bulgaria
Ceylon
Chile
China
Colombia
Czechoslovakia
Dominion of Canada
Denmark
Dutch East India
Esthonia
Finland
France
Germany
Gold Coast
Great Britain
Greece
Holland
Hungary
Indian Empire
Ireland
Italy
Japan
Jugoslavia
Kenya Colony
Latvia
Lithuania
Luxembourg
Mexico
Dominion of New Zealand
Norway
Nyasaland
Peru
Poland
Roumania
Russia
Southern Rhodesia
Spain
Sweden
Switzerland
Union of South Africa
United States of America

The American Section is made up of representatives of five groups. These groups are: (A) The leading national technical societies, such as American Society of Mechanical Engineers, American Institute of Electrical Engineers, etc.; (B) National industrial organizations, such as National Electric Light Association, American Gas Association, etc.; (C) Government departments and bureaus; (D) A group of individual members; and (E) A group of contributing members. The representatives of each organization in the first three groups, and a fixed number of elected members from the last two groups, constitute the Council of the American Committee.

The officers of the Council are a Chairman, Vice-Chairman and a Treasurer, elected every two years. Twelve Council members in addition to the officers constitute a "Board," which serves as the executive agency of the Council and of the Committee. Each of the groups above named will have three members on the Board. The present officers are: Mr. O. C. Merrill, Chairman, Mr. Henry J. Pierce, Vice-Chairman and Mr. H. M. Addinsell, Treasurer. The present Board members are as follows: from Group A, Mr. Calvin W. Rice, representing the American Society of Mechanical Engineers, Mr. George A. Orrok, representing the American Institute of Consulting Engineers, and Mr. Henry J. Pierce, representing the American Electro-Chemical Society; from Group B, Mr. Paul S. Clapp, representing the National Electric Light Association and Major Alexander Forward, representing the American Gas Association; from Group C, Dr. George Otis Smith, representing the U. S. Geological Survey, Mr. Scott Turner, representing the U. S. Bureau of Mines and Mr. O. C. Merrill, representing the Federal Power Commission; and from Group D, Mr. H. M. Addinsell of Harris, Forbes & Company and Colonel Hugh L. Cooper, Consulting Engineer. Appointments have not yet been made from Group E.

The increased participation of the United States on a broad basis in international affairs; the increased investment interests of this country in foreign electrical development; the extent to which the products of the American electrical manufacturers are entering into foreign trade; the growing complexity of foreign international organizations dealing with electrical matters; and the desirability of establishing a greater degree of cooperation in international economical relations all afford a field of unique service for a permanent organization such as the American Section of the World Power Conference.

The information which this organization can secure for its members and the opportunity which it affords to maintain contacts in the international interests of the industry, should be an inducement for all individuals and organizations affiliated with the National Electric Light Association to apply for membership in the American Section, in either Group D or E. Full information about membership and copies of the Constitution and By-Laws can be had on application to the Chairman, Edmonds Building, 917 Fifteenth Street, N. W., Washington, D. C.

Utilities Advertising Association Meeting

ABOUT seventy-five delegates attended the annual meeting of the Public Utilities Advertising Association, held in the Palmer House, Chicago, Ill., on May 14, in conjunction with the American convention of the International Advertising Association.

William H. Hodge of the Byllesby Engineering & Management Corp., Chicago, presided at the morning session, and H. M. Lytle of the Chicago Rapid Transit Co., presided at the afternoon session.

The address of welcome to the delegates was given by Samuel Insull, Jr., president of the Midland Utilities Investment Co., Chicago, Ill. Mr. Insull complimented the advertising men on their honest advertising effort, and said that the utility companies would benefit greatly from it.

J. C. Barnes of the New Orleans Public Service, Inc., and president of the P. U. A. A., then gave his President's address.

Following the reports of the treasurer, by Charles W. Person, the Koppers Company, Pittsburgh, Pa., and of the secretary, T. P. Pfeiffer, Byllesby Engineering & Management Corp., Chicago, Ill., these papers were presented: "Electrical Advertising—Yesterday and Today," by T. J. McManis, assistant manager, publicity department, General Electric Co., Schenectady, N. Y. "The Truth About Electrical Utility Advertising Expenditures," by William H. Hodge, vice-president, Byllesby Engineering & Management Corp., Chicago, Ill. "Selling Transportation with Advertising," by H. O. Crews, supervisor of publicity, Chicago Surface Lines, Chicago, Ill. "Outdoor Advertising for Gas Companies," by John F. Weedon of The Peoples Gas Light & Coke Co., Chicago, Ill.

The afternoon session opened with two papers on cooperative advertising. R. Bourke, manager, Electric Association of Chicago, discussed cooperative advertising in Chicago, and L. D. Gibbs, assistant head, public relations department, The Edison Electric Illuminating Co. of Boston, described a similar activity in his city.

Following reports of various committees, there was a discussion of "The Most Outstanding Developments of the Year in My Company's Advertising." L. K. Starr of the Georgia Power Co., Atlanta, Ga., told of a special street railway campaign, and Henry Obermeyer of the Consolidated Gas Co. of New York, talked on direct mail advertising for gas companies. L. F. Reigel, general sales manager, Virginia Electric & Power Co., Richmond, Va., explained the Stone & Webster monthly advertising contest and how it affects and stimulates the character of the operating company's advertising.

The last item on the program was an address entitled "Where Do We Go from Here?" by F. E. Eriksen, advertising manager, the Milwaukee Electric Railway & Light Co., Milwaukee, Wis.

The following officers were elected:

President, Louis D. Gibbs, the Edison Electric Illuminating Co., Boston, Mass.

First vice-president, Dana H. Howard, Commonwealth Edison Co., Chicago, Ill.

Second vice-president, Irving M. Tuteur, McJunkin Advertising Co., Chicago, Ill.

Third vice-president, R. S. McCarty, Philadelphia Co., Pittsburgh, Pa.

Secretary, R. E. Haas, Columbia Gas & Electric Co., New York, N. Y.

Treasurer, Howard F. Weeks, American Gas Association, New York, N. Y.

Camp "Co-op" Planned for August

CAMP COOPERATION IX, the the eighth annual conference of local electrical leagues will be held at Association Island, Henderson Harbor, N. Y., from Aug. 2 to 6, inclusive.

Held under the joint auspices of the Society for Electrical Development and the League Council, Camp Cooperation is used by local league managers as an opportunity to review and project business plans and principles essential to the furtherance of promotional and educational activities.

As in the past, invitations will be extended to league officials and representatives of central stations, manufacturing and other electrical concerns interested in promoting the market by cooperative means.

EMPLOYEE EDUCATION

Graduation Exercises of Light and Power Company Employees

Brooklyn Edison Company

TWO thousand employees of the Brooklyn Edison Company received certificates, diplomas and other awards the evening of June 25 in the auditorium of Erasmus Hall High School, Brooklyn, as the Educational Bureau of the Company brought to a close its most successful season.

Matthew S. Sloan, president of the company, and the only speaker of the evening, congratulated the employees and discussed the value of educational work to the employees taking advantage of it, to the company, and to the community.

After his address Mr. Sloan made the following awards: 2,272 certificates for the successful completion of single courses in the Edison School; 66 diplomas for the completion of five specified courses; and 18 prizes ranging from $100 to $10 for the best suggestions for improvement of the company's methods received during 1928. Forty-one per cent of the employees were enrolled in one or more courses this year, half that number receiving certificates, marking a substantial increase over 1927.

New Orleans Public Service

A GRADUATION which combined the festive air of a family party took place on June 21 in New Orleans, when the New Orleans Public Service graduated from its evening school more than 300 employee-students.

The graduates ranged from young men in their teens, who have been with the company a year or so, to gray-haired employees, whose service has extended for more than 40 years. The audience, occupying every seat and all standing room, included not only parents of the graduates, but in many instances wives and grown children.

The courses from which the students were graduated are all practical subjects and are offered to all employees. They range from Shop Arithmetic and Slide Rule to Utility Accounting and Practical Electricity, including several N. E. L. A. courses, and many dealing with specific needs encountered in the work of the company.

The class rooms comprise most of the eighth floor of the Public Service Building and are equipped with all necessary class room paraphernalia. The enrollment for the current session totaled 1219, or about one-third of the white employees of the company.—*H. M. Blain.*

New York Edison Company

GRADUATION exercises of the company schools conducted under the auspices of the Educational Committee of the Employees Association of The New York Edison Company, were held the night of June 18 in the auditorium of the Engineering Societies' Building, 29 West 39th Street, New York.

Nineteen prizes and 1,070 certificates of graduation were presented to 951 employees of gas and electric companies serving Manhattan, Bronx, Queens and Westchester county. The 951 graduates exceed by more than 100 the number receiving certificates a year ago. The principal courses of the company schools are technical, commercial and accounting, and this year the enrollment totaled 2,617. The schools are conducted for the benefit of ambitious employees, to enable them to fit themselves for promotion. The principal address was delivered by John W. Lieb, senior vice-president, New York Edison Company, who also presented the prizes.

CORRESPONDENCE

TO THE EDITOR:

For years the electric industry has sought the riddle of "what is electricity?" The answer is simple and has been generally overlooked. Will you do me the honor to publish the enclosed hypothesis?

1. All subdivisions of matter are relative and this is matter relativity.
2. Matter is divided into large bodies (planets), ordinary bodies, molecules, atoms, electrons, magnetrons (speculative), and so on, ad infinitum.
3. The science and study of large bodies in motion is astronomy, of ordinary bodies in motion is mechanics, of molecules in motion is physics, of atoms in motion is chemistry, of electrons in motion is electricity, and of magnetrons in motion is magnetism.
4. Small particles of matter moving rapidly through space produce the effect known as waves. These waves vary in length from extremely short to extremely long ones.
5. Unlocking matter appears as radiated energy of various wave lengths.
6. A wave is the sensory impression of the rapid movements through space of particles of matter, electrons for instance.
7. An electron is a subdivision of matter.
8. The electron is not electricity.
9. Electricity is not matter.
10. Electricity is the science and study of the movements and action of electrons in matter.
11. This whole problem is a question of matter relativity and the movement of unlocked particles of matter through space, giving rise to what we call waves. The wave is not the particle, neither is the particle the wave. A wave is not a thing, but the sensory impression of the movement of various sized particles of matter through space at various speeds.

C. L. KASSON,
3 Duke St.,
Mattapan, Mass.

* * *

TO THE EDITOR:

IN reading the article by "Amplifier" in the May issue of the N. E. L. A. BULLETIN, in which he states that the history of the electrical industry could be obtained and written (although a Herculean task) from the proceedings of the past conventions of the industry, the idea occurred to me that it would possibly be one of the best methods in which to acquaint or teach the public with the work the industry has already done and the work that they hope to accomplish in the future to write and publish such a history in some of the popular magazines of today. For example *The Saturday Evening Post, Red Book, American Magazine* and others.

The electrical magazines do not reach enough general readers for such a history or biography to provide much benefit to the public.

PAUL M. JOHANCEN,
Operator Swb.
Southern California Edison Co.,
Visalia, Cal.

WHAT OCCURRED LAST MONTH

Appliances

The case of the Merchant & Evans Company against the Philadelphia Electric Company, in which the plaintiff sought to prevent the defendant from selling appliances, particularly electric refrigerators, in connection with its utility business, on the ground that such sale was not within the corporate grant of the Philadelphia Electric Company was decided on June 7 in favor of the Philadelphia Electric Company by a Pennsylvania court.

* * *

Colorado River Project

On June 25 President Hoover signed a proclamation declaring that the states of California, Nevada, New Mexico, Utah and Wyoming have ratified the Colorado River Compact on a six-state basis within the six months' period required by the Swing-Johnson Bill, that the State of California has met the special requirements of that bill and that, as all the prescribed conditions have been fulfilled, the Swing-Johnson Bill is effective.

The terms of the Swing-Johnson Bill allowed six months for ratification of the Colorado compact by all seven of the Colorado Basin states, but provided that a six-state ratification should be sufficient after the passage of six months. As Arizona has not ratified the compact, it was necessary for the six months' period to pass before the bill could be effective with the compact ratified by only six states.

* * *

According to a dispatch in the New York *World,* Secretary of the Interior Wilbur announced in Las Vegas, Nev., that in making arrangements for development of the Colorado River he would first ask for bids on power development and, if satisfactory bids are not made, would proceed under the government development plan.

* * *

An Associated Press dispatch from Los Angeles, June 26, quotes Dr. Elwood Mead, Commissioner of Reclamation, as announcing that the Southern California Edison Company had offered to purchase a maximum amount of electrical energy to be generated at Boulder Dam.

* * *

On June 17 applications for preliminary power permits for a $200,000,000 project, including thirteen dams on the Colorado River between the Arizona-Nevada and Arizona-Utah borders, were filed with the Federal Power Commissions, by F. T. Colter, president of the Arizona Highline Reclamation Association, according to a dispatch from Phœnic, Ariz. Mr. Colter stated that the thirteen dams proposed would develop an aggregate of 5,000,000 hp., and would be located above the proposed Boulder Dam.

* * *

Consolidations

A recent announcement tells of the organization of the Commonwealth & Southern Corporation, which is to have a large interest in the common stock of the Commonwealth Power Corporation, the Southeastern Power & Light Company and the Penn Ohio Edison Company.

* * *

The Empire Public Service Company of Chicago has acquired the North Baltimore Service Company, the Rudolph Light & Power Company and the Wooster Electric Company, all of Ohio. It has also acquired the Toledo, Bowling Green & Southern Traction Company of Ohio.

* * *

The American Water Works & Electric Company of New York has gained a controlling interest in the Loudoun Light & Power Company of Purcellville, Va.

* * *

The United Gas Improvement Company announces purchase of a majority of the capital stock of the Erie County, Pa., Electric Company.

* * *

The Mountain States Power Company has purchased the Lander, Wyo., Electric Light & Power Company.

* * *

On June 18 announcement was made by J. P. Morgan & Company of the formation of the Niagara-Hudson Power Corporation, a holding company which will have interests in the Buffalo, Niagara & Eastern Power Corporation, Northeastern Power Corporation and Mohawk-Hudson Power Corporation. Offers are to be made to holders of common stock of these companies to exchange their securities for securities in the new corporation.

* * *

The New England Public Service Company has acquired the properties of the Lisbon, N. H., Light & Power Company and the Bethlehem, N. H., Electric Company.

* * *

The Pacific Gas & Electric Company of San Francisco is purchasing the properties of the Yuba River Power Company.

* * *

Announcement has been made of the formation of Inland Utilities, Inc., which will combine properties in Pennsylvania, West Virginia, Maryland and Virginia.

* * *

Earnings of Utilities

The Department of Commerce announces that gross earnings of public utility enterprises in April, exclusive of telephone and telegraph companies, as reported by 95 companies or systems operating gas, electric light, heat, power, traction and water service, were $190,000,000 as compared with $195,000,000 in March, and $181,143,683 in April, 1928.

* * *

Federal Trade Commission's Investigation

On June 4 the United States Senate adopted a resolution directing that the Attorney-General be furnished copies of the report of the Federal Trade Commission's investigation into newspaper ownership by power companies, together with the report of the Postmaster-General to the Senate on the ownership of the same newspapers "for such action as may be appropriate by the Department of Justice."

* * *

On June 5 Senator Phipps of Colorado, Chairman of the Post Office Committee of the Senate, introduced a bill to amend the present law governing newspapers' reports of ownership and circulation by providing that the Post Office Department, in addition to the names of stockholders, bondholders, or other security holders, may demand any additional information of the financial makeup of the newspaper which it may desire.

* * *

On June 12, at a session of the Federal Trade Commission, a statement by A. R. Graustein, president of the International Paper & Power Company, that his company had not given financial assistance to its subsidiary, the International Paper Company, in the latter's investments in thirteen newspapers, was entered in the record. A statement from the N. E. L. A. concerning payments made to educators for work in co-operation with the Association was also presented. A letter from C. G. Abbot, Director of the Smithsonian Institution, declaring that only 13 of the 1147 publications of the Smithsonian during the past ten years had been paid for by "outside parties," was also presented.

* * *

On June 13 witnesses before the Commission were Col. Ira C. Copley, former member of Congress and owner of a group of newspapers in California and Illinois, and W. J. Sylvester of Chicago, secretary and organizer of the Industrial Conservation Board, Inc. Mr. Copley, who appeared at his own request, asserted that he had no securities whatever in public utilities, and that there is not a dollar of the utilities' money invested in his newspapers.

Mr. Sylvester gave an outline of a program of activities to discourage government competition with private enterprise which has been contemplated by his organization. He declared that contributions for his organization had been received from some utilities.

* * *

On June 14 Josiah T. Newcomb, counsel of the Joint Committee of National Utility Associations, was examined by the Commission. He identified a number of memoranda and letters dealing with Boulder Dam, Muscle Shoals, the Walsh Resolution and other matters.

* * *

On June 14 a telegram from Paul S. Clapp, Managing Director of the National Electric Light Association, correcting an erroneous impression as to payments to educators by the N. E. L. A., left by the statement introduced on June 12, was presented.

* * *

On June 15 the Commission sent its Fifteenth Monthly Interim report on the inquiry to the Senate. This lists witnesses heard since the last report and mentions the progress of accounting work being done in the offices of certain holding companies and operating subsidiaries.

* * *

On June 19 the following witnesses were examined by the Commission: Thomas W. Martin, Birmingham, president of the Southeastern Power & Light Company and of the Alabama Power Company; Logan Martin, Birmingham, general attorney for those companies; Joseph F. McGowin, Mobile, financier; Ernest F. Ladd, president of the Merchants National Bank of Mobile; R. B. Chandler, editor of the *Mobile Press;* Victor H. Hanson, publisher of the *Birmingham News* and the *Birmingham Age-Herald;* and Abner Aldridge of Birmingham, president of two coal companies which are subsidiaries of the Southeastern Power & Light Company. Testimony concerned the financing of the *Mobile Press,* which began publication last April. Witnesses declared that no public utility money was invested in the paper, although loans, since repaid, of individuals interested in utilities, were made to Mr. Chandler.

On June 27, the Federal Trade Commission announced that it had adjourned hearings in its public utilities inquiry until September. A statement by the Commission announces that the hearings will be resumed after September 10, when rebuttal testimony will be introduced by representatives of the utilities. The statement says that the publicity and propaganda phase of the inquiry has not been completed. Work by the Commission's staff on material to be introduced in both publicity and financial phases of the investigation will be continued during the summer, the statement says.

* * *

Financial

According to a statistical survey issued by Stone & Webster and Blodget, Inc., new public issues of securities during the past six years totaled $45,803,000,000, of which $11,424,000,000 were securities of public utilities.

* * *

Hydro-Electric

On June 7, O. C. Merrill, Executive Secretary of the Federal Power Commission, submitted his resignation, to take effect July 1. He is to become head of the reorganized American section of the World Power Conference.

* * *

The Federal Power Commission holds that it has jurisdiction over the proposed water-power development at Cumberland Falls, according to an announcement made by its chairman, Secretary Good, on June 15, which tells of a decision of the Commission made at its June 14 meeting. The statement of the Commission includes an opinion rendered by its chief counsel, in which it is held that it is not within the power of the Commission to refuse a license to the Cumberland Hydro-Electric Company for construction of a water-power development at Cumberland Falls because of protests on the grounds of alleged prospective injury to the scenic features of the falls.

* * *

On June 17, the Federal Power Commission issued a statement on various cases involving authorization for permits to develop power, one project for which a preliminary permit was recommended is a proposed installation of 79,000 hp. on the South Platte River, by the city and county of Denver, Colo. Another recommendation is for a preliminary permit to the Virginia-Carolina Power Company for projects on the Roanoke River between Weldon, N. C., and Buggs Island, Va.

* * *

Dexter L. Cooper, Inc., has applied to the Federal Power Commission for a license covering the proposed tidal power development at Passamaquoddy Bay, Me. The plant calls for immediate installation of 464,000 hp. and ultimate installation of 1,000,087.

* * *

A party of English explorers, supported by the Royal Geographic Society and assisted by the Government of Newfoundland, arrived recently in New York City, after having completed almost a year of exploration and adventure in the wilderness of Labrador. They report enormous potential riches in timber and water power. The water power is said to be in a nest of great waterfalls, of which there are certainly four and possibly five.

* * *

Governor Young of California has signed a bill giving the State engineer power to supervise the design, construction and maintenance of all storage dams over 15 ft. in height. An appropriation of $200,000 is provided in the bill to make a study of more than 500 dams now in use in California. If any of these are found to be faulty, the State engineer is empowered to make such changes as will insure their safety. This bill was a result of the St. Francis Dam disaster.

* * *

On June 9, Secretary Wilbur announced the power and reservoir possibilities of the south and middle forks of the Salmon River, Idaho, will be surveyed by a party of engineers from the Geological Survey this summer.

* * *

The Washington Electric Company has applied to the Federal Power Commission for a license to construct two dams across the Columbia River at Rock Island by means of which 200,000 hp. of electrical energy would ultimately be developed, with an initial installation of 80,000.

* * *

Investors in Utilities

According to the annual public utilities survey made by Bonbright & Company, more than 3,000,000 investors have placed nearly $25,500,000,000 in the public utility business of the country, exclusive of steam railways. Of this about $10,300,000,000 is in the electric light and power industry.

* * *

Rates

On June 3, an agreement was filed in the Federal District Court in Boston under which the suit of the Worcester Electric Light Company against the Massachusetts Department of Public Utilities was withdrawn. The company had protested the order of the department for a five-cent initial rate. The company itself had instituted voluntarily a six-cent initial rate.

* * *

The New Bedford, Mass., *Standard*

says that a cut in the rates charged the city for electric current is announced.

* * *

The San Diego, Cal., Consolidated Gas and Electric Company recently placed in operation a new basic rate for residential and domestic electric service, which will bring three-cent electricity within the reach of the average user. The new rate is expected to increase the average residential demand through the use of additional electric appliances. Reductions are also made to high load factor power users, as well as in street lighting, commercial lighting and city power and light.

* * *

A new schedule of reduced electric power rates for large industrial and oil field power users has become effective in the Wyoming division of the Mountain States Power Company.

* * *

On June 4 the Nebraska Power Company announced in the Omaha papers that its new lower rates were in effect. The initial rate for domestic use is now 5½ cents.

* * *

The Hydro-Electric Power Commission of Ontario announces that 243 municipalities are to receive reductions in rates on current furnished by the Hydro.

* * *

On June 11 the California State Railroad Commission held hearings on rates of certain California utility companies, three gas and three telephone companies being represented. A number of other companies are to be heard from later.

* * *

Regulation

On May 28 the Massachusetts Senate passed the bill already passed by the House, which would permit municipalities to enter the electric business without first purchasing privately owned systems now serving them. This is the bill sponsored by the Massachusetts Department of Public Utilities as part of their campaign to influence utility companies to enter into contractual relations with the State for regulation of rates. Before passing the bill the Senate made four amendments. These have been rejected by the House, which appointed a conference committee to negotiate with the Senate.

* * *

During its recent session the Michigan Legislature passed, and the Governor of Michigan signed, a bill to encourage the construction of water-power projects, one provision of which is to the effect that, after 75 per cent of lands necessary for a water-power project have been purchased, condemnation proceedings may be started against owners of the remaining. Another bill which became law confers upon the State Conservation Commission authority to provide for the erection and maintenance of proper means for the free passage of fish through or over dams. Another bill provides for the creation of metropolitan districts embracing two or more cities, villages or townships, or combinations or parts of the same, for the purpose of acquiring, owning and operating parks or public utilities for supplying sewage disposal, drainage, water or transportation. The bill as originally drawn also included light and power, but this feature was afterward stricken out. Governor Green in signing the bill objected to striking out the provision concerning light and power.

* * *

On June 4 Governor Moody of Texas, addressing a new special session of the Legislature, advocated enactment of a law for regulation of public utilities in Texas.

* * *

Before adjourning June 9, the Massachusetts Legislature adopted a resolution creating a commission of seven members to investigate the activities of the utilities in Massachusetts. The legislature also passed the bill sponsored by the Massachusetts Department of Public Utilities, but in amended form, permitting municipalities to engage in the utility business without first purchasing the privately owned systems serving them. The Governor has signed the resolution and the bill.

* * *

The Wisconsin House has passed several bills affecting the utilities sponsored by the State League of Municipalities. One authorizes submission to the voters of a constitutional amendment permitting the State to go into the electric business. Another permits municipalities in rural districts to combine for the purpose of generating and distributing electricity. Another proposes a change in the constitution to remove from the existing debt-limitation any indebtedness created for the purpose of acquiring or constructing a municipal utility. The bills go to the Wisconsin Senate.

* * *

The President of the Massachusetts Senate and the Speaker of the House have announced appointment of the four members of the commission which is to investigate utilities in Massachusetts. The other three members are to be appointed by Governor Allen.

* * *

On June 19 six Republican Senators and Representatives in the New York Legislature were appointed as the Legislature's representatives on the special commission to investigate utility regulation in New York State. Governor Roosevelt is still to appoint three members of the commission.

* * *

On June 27, Governor Roosevelt of New York announced that he had appointed Frank P. Walsh and Professor James C. Bonbright of New York City, and David C. Adie of Buffalo, as members of the Commission to investigate utility regulation in New York State. These, with the six Republican Senators and Representatives already appointed, complete the personnel of the Commission.

Behind the Veil

(*Continued from page* 423)

den jar) may be charged, and from electric fire thus obtained spirits may be kindled, and all the other electric experiments be performed which are usually done by the help of a rubber, glass globe or tube, and thereby the sameness of the electric matter with that of lightning completely demonstrated."

Franklin made many notable observations, experiments and discoveries which have been amply reviewed in the celebrated work on electricity by Dr. Priestly. One of the most interesting has to do with the failure of European electricians in firing gun powder by the electric spark. Explaining his own method in his "Letters and Papers," he says that he sent a charge of electricity "through a small glass tube that had borne it well when empty, but when filled with water was shattered to pieces and driven all about the room. Finding no part of the water on the table, I suspected it to have been reduced to vapor. I was confirmed in that suspicion afterward when I had filled a like piece of the tube with ink and laid it on a sheet of paper, whereon after the explosion I could find neither any moisture nor any sully from the ink. This experiment of the explosion of water, which I believe was first made by that most ingenious electrician, Father Beccaria, may account for what we sometimes see in a tree struck by lightning, when part of it is reduced to fine splinters like a broom; the sap vessels being so many tubes containing a watery fluid, which, when reduced to vapor, sends every tube lengthways. And perhaps it is this rarefaction of the fluids in animal bodies killed by lightning or electricity that by separating its fibers renders the flesh so tender and apt so much sooner to putrefy. I think, too, that much of the damage done by lightning to stone and brick walls may sometimes be owing to the explosion of water found, during showers, running or lodging in the joints of small cavities or cracks that happen to be in the walls."

Picked up from

ELECTRICAL NEWS ITEMS

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Comparative Use of Electricity in Great Cities

INTERESTING comparisons of the use of electricity in the great cities of Europe with those of the United States have recently been made public by Dr. Adolph, general manager of the Berlin, Germany, City Electric Company.

While many of the European cities show a high proportion of wired homes, the average amount of electricity used *per consumer* is usually far below the figure commonly met with in the United States. In addition to this, the increased electrification of industry in this country shows a total use, when reduced to per capita figures, much in excess of anything found abroad. The proportion of wired homes in various cities in 1927 is given by Dr. Adolph as follows:

	Per Cent
Basle, Switzerland	100.0
The Hague, Holland	100.0
Zurich, Switzerland	99.3
Amsterdam, Holland	96.0
Copenhagen, Denmark	89.8
Stockholm, Sweden	88.8
Stuttgart, Germany	82.4
Paris, France	63.8
Budapest, Hungary	56.6
Berlin, Germany, about	50.0
* * * * *	
Chicago	96.3

The total annual sales of current for all purposes in these cities, when divided by the population, gives a good illustration of the extent of electrified industry and the degree to which the inhabitants are making use of electricity. As given by Dr. Adolph, the per capita sales of energy in various cities in 1927 was:

	Kilowatt hours per capita
Basle, Switzerland	640
Zurich, Switzerland	604
Stockholm, Sweden	295
Paris, France	279
Stuttgart, Germany	258
Berlin, Germany	252
Amsterdam. Holland	236
Vienna, Austria	210
The Hague, Holland	209
Hamburg, Germany	209
Copenhagen, Denmark	195
London, England	151
Budapest, Hungary	135
* * * * *	
Chicago	1088
Philadelphia	914
Detroit	884
New York	667

The American Home

IN the course of an address on "The American Home in Citizenship Training" delivered before the convention of the National Congress of Parents and Teachers, the Hon. Ray Lyman Wilbur, Secretary of the Interior, said:

"Labor-saving devices in the home, easily accessible automobiles in the garage, and good highways have to some degree made the home a distributing center for its members rather than an assembling point. Fortunately automobiles are large enough so that most of our families can go together in one. Fortunately, too, there is less drudgery for the mother, so she can be an active citizen herself and can if she chooses have more time for her children."

This might have been written by someone in the merchandising department of a light and power company endeavoring to explain the social advantages of electrical appliances for eliminating the drudgery of housekeeping.

Electric Altimeter New Safety Factor for Airplanes

ACCORDING to *Telegraph and Telephone Age*, Dr. E. F. W. Alexanderson has recently invented an altimeter for airplanes, using the familiar red, green, and yellow lights of ground traffic, and which shows the aviator exactly his height from the earth regardless of whether he can see land or not. It has already been satisfactorily tested and gives promise of making flying safe in rain, fog or at night. The device is based on the theory that the time interval required for a radio impulse to travel from a plane to the ground and back again to a receiving set on the plane might be practically adapted as a reliable altitude indicator.

The visual recording instrument is small and may be mounted on the cockpit panel in full view of the pilot. It consists of a motor on which ground distance up to 3000 feet or down to within 50 feet of the earth may be instantly recorded. In his experiments Dr. Alexanderson used an oscillating receiver, one of the type which sends out a wave which may be picked up on other receivers as a squealing note or beat. The echo or reflected signal was picked up on the same receiver which sent out the wave. He discovered that every time the airplane changed altitude by half a wave length a whistling note went through a complete tone cycle, from low pitch to a high pitch and back again to a low pitch. By counting the cycles of the tone it was possible to measure the altitude, the measuring stick being one-half the wave length of the antenna oscillator.

All-Electric Garage

A TWENTY-FIVE story garage, said to be the only one in existence which employs electric power for all automobile handling within the building, has recently been completed on East Forty-fourth Street, New York City.

There are six receiving spaces served by three elevators carrying two cars each. Each elevator platform is equipped with two electric parkers which tow the cars onto the elevators from the receiving spaces and take them off the elevators into their spaces on the storage floors.

The parker is a very low towing unit which runs beneath the car and engages with the rear axle housing by means of an adjustable coupler. It is controlled by the elevator operator.

The garage has an installation of 150 kilowatts for lighting and 800 horsepower for the operation of pumps, washers, elevators, door openers and parking motors.

THE BOSS OF THE STREET LIGHTS

In a little North Carolina town there is a Superintendent of Public Works whose duties cover, among other things, the operation with his own hands, unaided, of the electric light system, water works system, volunteer fire department, maintenance and repair, meter reading, replacing blown fuse plugs when some good housewife's flatiron acts up, and so forth.

Needless to say, our unsung hero has no great amount of time to devote to the study of either the Einstein theory or the fourth dimension and, in fact, has trouble enough in being on hand to turn on and off the lights at just the right time to suit all concerned. To the possessor of such talents and ingenuity as one must possess to fill his post successfully this did not present an insuperable problem. In his back yard is a hefty rooster of staid and dependable habits whose belief in the "early to bed and early to rise" habit is unshakable.

Here, then, are the problems and the elements of their solution:

A special perch was arranged for friend rooster pivoted at one end and so arranged that his weight would depress the perch a few inches to pull down on a cord to close the street lighting circuit regularly at dusk and to open it when old reliable leaves his perch at break of day.

To the best of my knowledge there is no device on the market today capable of taking cognizance of the early dusk on a rainy day or late darkness on a clear day or of the variable hours of dawn with the changing weather as does this old rooster.

—*L. H. Hardin, in Electrical World.*

THE REVIEWING STAND

Operating Code Manual

Serial report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-58, 28pp. Price, 40 cents; to members, 25 cents.

THIS Operating Code Manual presents in a convenient form all of the previous reports of the Subcommittee, outlining rules of operating procedure in both boiler and turbine rooms of steam-generating plants. As it is impossible to formulate one set of rules to fit all cases, this Manual makes no attempt to stress adherence to the sequence of the different operations, it being understood that modifications are necessary, depending upon the best judgment of the particular problems and upon the installed equipment in each individual plant.

The value of this Manual is not measured by the exactness with which the rules embodied are carried out, but rests, rather, upon the fact that these rules in their general make-up include all possible necessary phases of any particular operation.

The Manual is divided into two sections: the boiler plant and the prime mover plant. Under general operation of the boiler plant, the following subjects are covered: Boilers, coal-handling equipment, pulverized fuel, auxiliaries, fans, boiler feed pumps, feed water heaters and evaporators. The routine care and maintenance of boilers, boiler auxiliaries and instruments also is covered in the first section.

The general operation under Section 2—prime mover plant—covers turbines, reciprocating engines and auxiliaries. The routine care and maintenance of turbines and auxiliaries concludes the Manual.—*E. S. B.*

Types of Distribution Systems, and Methods of Effecting Changeover

Serial report, Overhead Systems Committee, Engineering National Section, N. E. L. A Publication No. 289-46, 28pp., 20 illustrations. Price, 40 cents; to members, 25 cents.

IN this report the study of distribution practices is restricted to the subject of the design of the individual feeder layout for one general type of system, namely, the 4000-volt, three-phase, four-wire system. In presenting this report the Committee believes that a general analysis of the various types of feeder layout and the advantages and disadvantages of the various classifications, particularly as to where their application is economical, will be of value. The application of the various types to actual systems is also discussed.

In the second part of this report various methods of changing over to 4000-volt, three-phase, four-wire system from two-phase and three-phase, 2300-volt systems are discussed. As the data in a previous report (Publication No. 267-15) indicated that a number of companies were considering such a changeover, this collection of data regarding the experience and methods followed by other companies effecting similar changes is pertinent. The report is based on a survey of ninety-five companies. Studies were made of the distribution systems of forty-eight of these companies operating a 4000-volt Star System.

Operating circuit maps are given, which illustrate in detail the important features of several typical circuits. These maps as reproduced in the report illustrate in a comparable manner the application of the various types of systems.—*E. S. B.*

Boiler and Turbine Room Instruments

Serial report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-59, 32pp., 37 illustrations, 3 tables. Price, 50 cents; to members, 35 cents.

BOILER and turbine room instruments as now offered by the various manufacturers show marked improvement in accuracy, reliability and decreased maintenance according to the findings of the Committee, which has studied this subject. In this report the Committee states there is still room for further progress in these directions, particularly as to flow meters and instruments for the measurement of the temperature of water, gases and steam where weighted averages are so necessary for obtaining true efficiencies.

Results are noted in this study that with the increasing size of boiler units, as well as generating units, the cost of an instrument installation has become a very small percentage of the total cost of the equipment. Consequently there has been a tendency toward the use of extremely elaborate instrument installations. In view of this fact, the report repeats a previous warning to the effect that the Committee believes it better to install too few instruments than to install more than can be taken care of by the operating organization.

The report is based chiefly on the statements of member companies and manufacturers, and is profusely illustrated. A bibliography is included.—*E. S. B.*

Training for Better Public Contact —Analysis of Public Contact Work

Serial report, Industrial Relations Committee, Public Relations National Section, N. E. L. A. Publication No. 289-44, 12pp. Price, 15 cents; to members, 10 cents.

THIS is the second report of a series of four being prepared by the Industrial Relation Committee's Public Contact Training Subcommittee on this all-important subject. This report outlines a method of analysis of public-contact work which brings to light the nature and range of contacts, and arranges this information in a suitable form to be used as the basis for the preparation of a training program.

This report deals only with an analysis of the work. The subject of suitable training methods is to be discussed in the third report of this series.

Inasmuch as there are very few departments in an electric utility which do not have at least some contact with the public, the subject being covered in this series of reports is one of real importance to all member companies.—*E. S. B.*

Public Speaking Committee

Serial report, Public Speaking Committee, Public Relations National Section, N. E. L. A. Publication No. 289-77, 12pp., 1 table, 2 illustrations. Price, 25 cents; to members, 15 cents.

THE Public Speaking Committee outlines its work during the past year in this report. In pointing out the importance of public speaking activities, both to the customers and to the employees, this Committee has made it its purpose to encourage these activities not only persistently and continuously, but also to encourage member companies to carry on this work in a systematic, businesslike way.

The report reviews the work of the Committee in developing a statement of its Policies and Plans, which is given in the report. A comparison of Public Speaking activities for 1928 and 1927 by geographic divisions and States is given in tabular form. This comparison shows that a total of 36,887 talks were given to a total audience of 4,629,926, or 5603 talks to 764,456 more people than were reported in the last previous report.—*E. S. B.*

Lamp Committee

Serial report, Lamp Committee, N. E. L. A. Publication No. 289-67 16pp., 8 tables, 13 illustrations. Price, 30 cents; to members, 20 cents.

THIS serial report presents facts and figures and reviews developments in the Incandescent Lamp field during the past year. The informative and interesting detailed information with respect to this important branch of the business is certain to be of interest to all member companies.

In addition to the statistics on lamp sales, average lumens, watts and efficiency of lamps, distribution by voltage. demand by sizes, street series lamps, and price changes, the report discusses lamp developments and the use of lamps of proper voltage. The use of lamps for sound pictures and the development in the usage of submerged or underwater lamps, also are discussed. The report also includes most interesting and favorable comments on the progress of airport lighting. Lighting demonstrations and special exhibits is another subject reviewed by the Committee.

A most interesting part of the report deals with the Fiftieth Anniversary of the Incandescent Lamp, in which the Committee adds to the universal acclaim its tribute of admiration and esteem for Edison, the genius, and for Edison, the man.—*E. S. B.*

Building the Load on the Farm

Serial report of Rural Electric Service Committee, N. E. L. A. Publication No. 289-61, 24 pp., 31 illustrations, 1 table. Price, 40 cents; to members, 25 cents.

IN this report the Rural Electric Service Committee presents evidence that an acceptable load for electric light and power companies exists and can be developed by intelligent effort on the 6,371,640 farms in the United States.

The survey on which this report is based covers almost every State in the Union. Listed in this report are the names and addresses of farmers using 3000 kw-hr. or more per year. A brief summary of the purposes for which the electricity is employed is also given in this list, which is classified according to States. Numerous illustrations picture electricity at work on various classes of farms.

This evidence of how the load is being built on the farm is a valuable contribution to the industry, and should be in the possession of every progressive company.—*E. S. B.*

The Use of Hydro-Electric Units as Synchronous Condensers

Serial report, Hydraulic Power Committee, Engineering National Section, N. E. L. A Publication No. 289-66, 16pp., 5 charts. Price, 15 cents; to members, 10 cents.

THIS serial report, edited from the Convention report of the Hydraulic Power Committee, National Southeastern Section, is a valuable contribution on this subject. The use of hydro-electric units as synchronous condensers is coming to be an accepted practice in the field of hydro-electric development. The Committee states that this practice, like so many other electrical problems, is the direct result of the ever-increasing demand for better voltage, better power factor and for better service conditions. All public utility concerns now recognize the necessity of operating their systems in such a way as to meet this ever-increasing demand.

The general experimental results and economic conclusions of a number of operating companies who have equipped their hydro plants so the units can be used as synchronous condensers is recorded in the report. The questionnaire which formed the basis of study, and which was sent to all southern hydro-electric companies who indicated that they were using their generators as synchronous condensers, is included in the report, along with five tables containing tabulations of the replies to the questionnaire.—*E. S. B.*

Foreign Developments

Serial report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-64. 36pp. 29 illustrations; 5 tables. Price 55 cents; to members 35 cents.

THIS Serial Report contains interesting statements by American engineers, among them Messrs. I. E. Moultrop, A. D. Bailey and G. A. Orrok. Several foreign engineers have contributed general statements, including Messrs. F. H. Rosencrants, W. H. Patchell, A. L. Mellanby, J. Mas Nieto and R. H. Andrews. A number of other prominent European engineers have submitted statements covering some detailed engineering developments. Abstracts from foreign journals also are included. The opinions expressed in these statements are quite specific and indicate the general trend of power plant development in foreign countries. —*E. S. B.*

Penstock Valves

Serial report, Hydraulic Power Committee, Engineering National Section, N. E. L. A. publication No. 289-72. 28pp. 19 illustrations. Price 40 cents; to members 25 cents.

A BRIEF review of current practice in the use of valves in penstocks is given in this report of the Hydraulic Power Committee. The investigation of this Committee has been limited to the types of valves which were located in a closed penstock or conduit leading from an open forebay or surge chamber to the hydraulic power units of a water power plant.

The data included in this report were submitted by seven member companies and five manufacturers. The report will be of interest to designers, manufacturers and operating companies as it is a most authoritative presentation of this subject.

The report includes discussion on the following: location of penstock valves; choicee of type of valve; loss of head in valves; use of valves as meters; power required to operate valves; cost; reliability in operation; leakage; emergency operation; operating mechanism, and details of design.—*E. S. B.*

Suggested Specifications for Overhead Line Materials and Methods of Construction for Low and Medium Voltage Lines

Serial Report, Overhead Systems Committee, Engineering National Section, N. E. L. A. Publication No. 289-45. 72 pp. 63 illustrations. Price 90 cents; to members 60 cents.

THIS report of the Overhead Systems Committee covers three years' work and is presented in three parts.

The first deals with the use of recommended practices suggested in 1924. New recommended practices and a review of materials is the subject of part two. Part three gives the methods of construction for low and medium voltage lines. Forty full-page drawings accompany the detailed suggested specifications. Thirteen photographs are reproduced showing typical installations of potheads, filled with either compound or oil in various positions on line arms or buck arms, and eight illustrations show typical transformer platform installations. The report also includes five full-page plates illustrating methods of construction using materials covered by part two of the report.—*E. S. B.*

Mechanical Reliability of Hydro-Electric Units—1927

Serial report, Hydraulic Power Committee, Engineering National Section, N. E. L. A. Publication No. 289-68. 20pp. 6 tables. 3 charts. Price 30 cents; to members 20 cents.

THE HYDRAULIC Power Committee presents in this report the result of its fourth year's study of this subject. In the collection, tabulation and analysis of the data no change has been made from the previous year's procedure. The data in this report are compiled from records contributed from 134 units as compared with 95 in the 1926 report. This indicates the encouraging increase which has been noted by member companies operating eligible units from year to year.

The information is set forth in detail in six tables showing the principal characteristics of hydro-electric units, 1927 data; mechanical reliability of hydro-electric units—1927; summary of operating records, hydro-electric units; analysis of outage hours, 1927 data; average outage time classified by years of installation, and analysis of causes of outage in per cent of total outage time. —*E. S. B.*

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(*Entire Dominion of Canada*)

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President, F. R. Phillips, Duquesne Light Co., Pittsburgh, Pa.; *Managing Director*, A. B. Millar, Telegraph Bldg., Harrisburg, Pa.

Empire State Gas and Electric Association

President, Charles S. Ruffner, Mohawk-Hudson Power Corp., Albany, N. Y.; *Secretary*, Charles H. B. Chapin, 5618 Grand Central Terminal Bldg., New York, N. Y.

New Jersey Electric Association

President, C. H. Howell, Atlantic City Electric Co., Atlantic City, N. J.; *Secretary*, S. F. Delany, Atlantic City Electric Co., Atlantic City, N. J.

Pennsylvania Electric Association

President, F. R. Phillips, Duquesne Light Co., Pittsburgh, Pa.; *Managing Director*, A. B. Millar, Telegraph Bldg., Harrisburg, Pa.

East Central Division

(*Kentucky, Ohio, West Virginia*)

President, L. B. Herrington, Kentucky Utilities Co., Louisville, Ky.; *Secretary-Treasurer*, D. L. Gaskill, 603½ Broadway, Greenville, Ohio.

Kentucky Association of Public Utilities

President, Samuel Riddle, Louisville Railway Co., Louisville, Ky.; *Secretary*, E. F. Kelley, Louisville Railway Co., Louisville, Ky.

Public Utilities Association of West Virginia

President, A. C. Spurr, Wheeling Traction Co., Wheeling, W. Va.; *Secretary*, A. Bliss McCrum, Box 1483, Charleston, W. Va.

Great Lakes Division

(*Illinois, Indiana, Michigan, Wisconsin*)

President, G. C. Neff, Wisconsin Power & Light Co., Madison, Wis.; *Secretary*, Tom C. Polk, 910 Marquette Bldg., Chicago, Ill.

Illinois State Electric Association

President, E. F. Kelly, Central Illinois Public Service Co., Springfield, Ill.; *Secretary-Treasurer*, George W. Schwaner, 205 Illinois Mine Workers Bldg., Springfield, Ill.

Indiana Electric Light Association

President, C. V. Sorenson, Central Indiana Power Co., Indianapolis, Ind.; *Secretary-Treasurer*, William Stokes, 1548 Consolidated Bldg., Indianapolis, Ind.

Michigan Electric Light Association Section

President, Howard Pett, Consumers Power Co., Jackson, Mich.; *Secretary-Treasurer*, Herbert Sylvester, The Detroit Edison Co., Ann Arbor, Mich.

Wisconsin Utilities Association

President, C. R. Phenicie, Wisconsin Public Service Corp., Green Bay, Wis.; *Executive Secretary*, John N. Cadby, 502 Brumder Bldg., 105 Wells St., Milwaukee, Wis.

*Middle Atlantic Division

(*To Consist of Delaware, District of Columbia, Maryland, Virginia*)

Maryland Utilities Association

President, H. T. Connolly, Washington, Baltimore & Annapolis Electric Railroad Company, Baltimore, Md.; *Secretary*, D. E. Kinnear, United Railways & Electric Company, Baltimore, Md.

Public Utilities Association of Virginia

President, A. W. Higgins, Virginia Public Service Co., Charlottesville, Va.; *Secretary*, A. B. Tunis, 301 East Grace Street, Richmond, Va.

Middle West Division

(Iowa, Kansas, Missouri, Nebraska)

President, A. E. Bettis, Kansas City Power & Light Co., Kansas City, Mo.; *Managing Director,* Thorne Browne, 1527 Sharp Bldg., Lincoln, Neb.

Iowa Section

President, C. S. Macy, Iowa Power & Light Co., Adel, Iowa; *Managing Director,* Joe Carmichael, 310 Crocker Bldg., Des Moines, Iowa.

Kansas Section

President, Frank M. Stone, Kansas Utilities Co., Fort Scott, Kan.; *Secretary,* H. Lee Jones, 820 Kansas Avenue, Topeka, Kan.

Missouri Association of Public Utilities

President, A. E. Reynolds, Springfield Gas & Electric Co., Springfield, Mo.; *Secretary-Treasurer,* F. D. Beardslee, 315 North Twelfth Street, St. Louis, Mo.

Nebraska Section

President, C. W. Amidon, Central Power Co., Grand Island, Neb.; *Managing Director,* Thorne Browne, 1527 Sharp Bldg., Lincoln, Neb.

New England Division

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)

President, C. H. Hodskinson, The Edison Electric Illuminating Co., Boston, Mass.; *Secretary,* Miss O. A. Bursiel, Room 1113 Statler Bldg., 20 Providence Street, Boston, Mass.

(This Division Has No State Sections)

North Central Division

(Minnesota, North Dakota, South Dakota)

North Central Electric Association

President, Thomas T. Parker, Northwestern Public Service Co., Huron, S. D.; *Secretary,* John W. Lapham, 803-804 Plymouth Bldg., Minneapolis, Minn.

(This Division Has No State Sections)

Northwest Division

(Alaska, Idaho, Montana, Oregon, Utah, Washington)

Northwest Electric Light and Power Association

President, M. L. Hibbard, Idaho Power Co., Boise, Idaho; *Secretary,* Berkeley Snow, Room 1206, Spaulding Bldg., Portland, Ore.

(This Division Has No State Sections)

Pacific Coast Division

(Arizona, California, Hawaii, Nevada, Philippine Islands)

Pacific Coast Electrical Association

President, E. B. Criddle, Southern Sierras Power Co., Riverside, Cal.; *Secretary,* Samuel H. Taylor, Suite 729-730, 447 Sutter Street, San Francisco, Cal.

Arizona Utilities Association

President, M. A. Pooler, Tucson Gas, Electric Light & Power Co., Tucson, Ariz.; *Secretary,* L. C. McCullough, 134 South Central Avenue, Phoenix, Ariz.

Rocky Mountain Division

(Colorado, New Mexico, Wyoming)

President, W. D. Johnston, Mountain States Power Co., Casper, Wyo.; *Secretary,* O. A. Weller, Public Service Co. of Colorado, Denver, Colo.

The Colorado Utilities Association

President, V. L. Board, Public Service Co. of Colo., Denver, Colo.; *Secretary,* O. A. Weller, Public Service Co. of Colo., Denver, Colo.

New Mexico Utilities Association

President, W. W. Nielsen, New Mexico Power Co., Santa Fe, N. M.; *Secretary-Treasurer,* Bernard L. Wiles, Albuquerque Gas & Electric Co., Albuquerque, N. M.

Wyoming Utilities Association

President, W. D. Johnstone, Mountain States Power Co., Casper, Wyo.; *Secretary,* F. A. Probst, Mountain States Telephone & Telegraph Co., Casper, Wyo.

Southeastern Division

(Alabama, Cuba, Florida, Georgia, North Carolina, South Carolina, Tennessee, Porto Rico)

President, T. H. Tutwiler, Memphis Power & Light Co., Memphis, Tenn.; *Secretary,* C. M. Kilian, 207-8 Bona Allen Bldg., Atlanta, Ga.

Southwestern Division

(Arkansas, Louisiana, Mississippi, Oklahoma, Texas)

President, Fred W. Insull, Public Service Co. of Oklahoma, Tulsa, Okla.; *Secretary,* S. J. Ballinger, San Antonio Public Service Co., San Antonio, Tex.

Arkansas Utilities Association

President, W. E. Bann, Southwestern Gas & Electric Co., Texarkana, Tex.; *Secretary,* R. I. Brown, Arkansas Central Power Co., Little Rock, Ark.

Mississippi Electric League

President, A. H. Jones, Jones-Johnson Co., McComb, Miss.; *Secretary,* A. R. Riddick, A. G. Riddick, Inc., Jackson, Miss.

Oklahoma Utilities Association

President, Thomas R. Weymouth, Oklahoma Natural Gas Corp., Tulsa, Okla.; *Secretary,* Edward F. McKay, 1020 Petroleum Bldg., Oklahoma City, Oyla.

Southwestern Public Service Association

President, Knox Lee, Southwestern Gas & Electric Co., Marshall, Tex.; *Secretary,* E. N. Willis, 403 Slaughter Bldg., Dallas, Tex.

***Note: This Division is in Process of Formation.**

SECTIONS, BUREAUS AND COMMITTEES

Chairmen's names only listed here

Special National Committees

Advertising Committee—(To be determined.)

Charles A. Coffin Prize Committee—M. S. Sloan, The New York Edison Co., New York, N. Y.

Codes and Standards Committee—Irvin W. Day, The Connecticut Light & Power Co., Waterbury, Conn.

Constitution and By-Laws Committee—R. F. Pack, Northern States Power Co., Minneapolis, Minn.

Electrification of Steam Railroads Committee—Britton I. Budd, Public Service Co. of Northern Illinois, Chicago, Ill.

Exhibition Committee—E. W. Goldschmidt, Wagner Electric Corp., New York, N. Y.

Finance Committee—Sidney Z. Mitchell, Electric Bond & Share Co., New York, N. Y.

Lamp Committee—Frank W. Smith, The United Electric Light & Power Co., New York, N. Y.

Prize Awards Committee—W. H. Onken, Jr., *Electrical World,* New York, N. Y.

Public Policy Committee—P. S. Arkwright, Georgia Power Co., Atlanta, Ga.

Rate Research Committee—L. R. Nash, Stone & Webster, Inc., Boston, Mass.

Water Power Development Committee—Paul A. Schoellkopf, The Niagara Falls Power Co., Buffalo, N. Y.

Wiring Policy Committee—J. E. Davidson, Nebraska Power Co., Omaha, Neb.

General National Committees

***Civic Development Committee**—John B. Reynolds, Middle West Utilities Co., Chicago, Ill.

***Educational Committee**—Fred R. Jenkins, Commonwealth Edison Co., Chicago, Ill.

***Insurance Committee**—W. H. Sawyer, Stevens & Wood, Inc., New York, N. Y.

***Membership Committee**—A. Jackson Marshall, National Electric Light Association, New York, N. Y.

***Rural Electric Service Committee**—Eugene Holcomb, Consumers Power Co., Jackson, Mich.

Accounting National Section

***Section's Executive Committee**—W. R. Emerson, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

Budget Committee—(To be determined.)

***Classification of Accounts Committee**—(To be determined.)

Corporate Finance Committee—(To be determined.)

***Customers' Records Committee**—(To be determined.)

***Fixed Capital Committee**—(To be determined.)

***General Records Committee**—(To be determined.)

***Purchasing and Storeroom Committee**—(To be determined.)

***Statistics Committee**—(To be determined.)

Commercial National Section

***Section's Executive Committee**—Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

***Commercial and Industrial Power and Heating Bureau**—V. M. F. Tallman, Charles H. Tenney & Co., Boston, Mass.

Commercial Cooking Committee—(To be determined.)

Electric Truck Committee—(To be determined.)

General Power Committee—(To be determined.)

Industrial Heating Committee—(To be determined.)

***Lighting Bureau**—T. O. Kennedy, The Ohio Public Service Co., Cleveland, Ohio.

Commercial and Industrial Lighting Committee—(To be determined.)

Electrical Advertising Committee—(To be determined.)

Home Lighting Committee—(To be determined.)

Street Lighting Committee—(To be determined.)

***Merchandising Bureau**—Frank D. Pembleton, Public Service Electric & Gas Co., Newark, N. J.

Domestic Electric Range Committee—(To be determined.)

Merchandise Sales Committee—(To be determined.)

Refrigeration Committee—(To be determined.)

Water Heating Committee—(To be determined.)

***Customer Relations Committee**—(To be determined.)

Promotional Rates Committee—(To be determined.)

***Wiring Sales Committee**—(To be determined.)

Engineering National Section

***Section's Executive Committee**—A. D. Bailey, Commonwealth Edison Co., Chicago, Ill.

***Accident Prevention Committee**—C. R. Beardsley, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

***Electrical Apparatus Committee**—(To be determined.)

Engineering Administration Committee—(To be determined.)

***Hydraulic Power Committee**—Byron E. White, Utica Gas & Electric Co., Utica, N. Y.

***Inductive Coordination Committee**—H. L. Wills, Georgia Power Co., Atlanta, Ga.

***Meter Committee**—(To be determined.)

***Overhead Systems Committee**—(To be determined.)

***Power System Engineering Committee**—(To be determined.)

***Prime Movers Committee**—(To be determined.)

Special Engineering Research Committee—(To be determined.)

***Underground Systems Committee**—(To be determined.)

Public Relations National Section

***Section's Executive Committee**—Harry Reid, National Electric Power Co., New York, N. Y.

***Cooperation with Educational Institutions**—(To be determined.)

***Customer Ownership**—W. H. Hodge, Byllesby Engineering & Management Corp., Chicago, Ill.

***Industrial Relations Committee**—Homer E. Niesz, Commonwealth Edison Co., Chicago, Ill.

***Information Bureau Committee**—T. A. Kenney, Allied Power & Light Corp., New York, N. Y.

Manufacturers' Advertising Committee—(To be determined.)

***Public Speaking Committee**—W. S. Vivian, Middle West Utilities Co., Chicago, Ill.

***Relations with Financial Institutions Committee**—A. W. Robertson, Westinghouse Electric & Manufacturing Co., New York, N. Y.

***Women's Committee**—(To be determined.)

***Provision is made for a representative from each Geographic Division.**

CONVENTIONS AND MEETINGS

Meeting of the Section, Bureaus and Committees of the National Electric Light Association are shown in roman type; those of other associations in italics

1929

July

1–4 ***American Society of Mechanical Engineers, Salt Lake City, Utah***

1–5 ***American Home Economics Association Convention and Exhibition, Statler Hotel, Boston, Mass.***

16 Industrial Relations Committee, Edison Building, Chicago, Ill.

16 Public Speaking Committee, Edison Building, Chicago, Ill.

17 Officers and Members-at-Large, Executive Committee, Accounting National Section, 11 a. m., N. E. L. A. Headquarters, New York, N. Y.

17 Executive Committee, Public Relations National Section, Room 1741, Edison Building, Chicago, Ill.

18–19 Electric Section, Wisconsin Utilities Association, Hotel Wausau, Wausau, Wis.

August

27–30 ***National Association of Railroad and Utilities Commissioners, Glacier National Park Hotel, Glacier National Park, Mont.***

September

2–4 Rocky Mountain Geographic Division Hotel Colorado, Glenwood Springs, Colo.

4–6 Pennsylvania Electric Association, Bedford Springs Hotel, Bedford Springs, Pa.

9–12 New England Geographic Division, Hotel Griswold, New London, Conn.

9–13 ***American Society for Steel Treating, Cleveland, Ohio.***

9–14—*Association of Edison Illuminating Companies, Quebec, Canada.*

19–20 Empire State Gas and Electric Association, Saranac Inn, Saranac Lake, N. Y.

24 Executive Committee, Public Relations National Section, Room 1741, Edison Building, Chicago, Ill.

24–27 *Illuminating Engineering Society, Bellevue-Stratford Hotel, Philadelphia, Pa.*

25 National Executive Committee, Room 1741, Edison Building, Chicago, Ill.

26–28 Great Lakes Geographic Division, French Lick Springs, Ind.

28–30 *American Electric Railway Association Convention and Exhibit, Municipal Auditorium, Atlantic City, N. J.*

30 *National Safety Council, Stevens Hotel, Chicago, Ill.*

October

1–4 ***American Electric Railway Association Convention and Exhibit, Atlantic City Auditorium, Atlantic City, N. J.***

1–4 ***National Safety Council, Stevens Hotel, Chicago, Ill.***

7–10 ***Third National Fuels Meeting, American Society of Mechanical Engineers, Bellevue-Stratford Hotel, Philadelphia, Pa.***

14–18 ***American Gas Association, Atlantic City, N. J.***

22 *The Electric Association, Chicago, Ill.*

November

21–22 Public Utilities Association of Virginia, Chamberlain-Vanderbilt Hotel, Old Point Comfort, Va.

NEW MEMBERS

Electric Light and Power Companies (Class A)

Illinois, Chicago, Bayfield Utilities Company

New York, Ticonderoga, The Ticonderoga Electric Light & Power Co.

Ohio, Columbus, The Columbus Railway, Power and Light Company

Employees of Electric Light and Power Companies (Class B)

Alabama, Birmingham, Alabama Power Company
J. Nicholson (New York, N. Y.)
Leo C. Turner (New York, N. Y.)

Arkansas, Warren, Arkansas General Utilities Company
Ray Blasdel (Harrisburg, Pa.)
H. R. Bodenmuller (Harrisburg, Pa.)
W. A. Burrell (Harrisburg, Pa.)
A. E. Dye (Harrisburg, Pa.)
John R. Gaugler (Harrisburg, Pa.)
W. B. Goldsberry, (Harrisburg, Pa.)
Pate R. Hall (Harrisburg, Pa.)
E. F. Johnson (Harrisburg, Pa.)
C. J. Koetting (Harrisburg, Pa.)
J. C. Kuykendall (Harrisburg, Pa.)
Miss Grace Larrabee (Harrisburg, Pa.)
E. T. Lovell (Harrisburg, Pa.)
Miss Gertrude McDowell (Harrisburg, Pa.)
Miss Lela Orange (Harrisburg, Pa.)
R. S. Phillips (Harrisburg, Pa.)
J. W. Price (Harrisburg, Pa.)
Myrle Richard (Harrisburg, Pa.)
L. D. Turner (Harrisburg, Pa.)
F. K. Woodring (Harrisburg, Pa.)

California, Los Angeles, Southern California Edison Company
H. B. Abbott (Altadena, Cal.)
J. S. Accord (Chino, Cal.)
C. I. Adams (Hynes, Cal.)
J. V. Adams
H. D. Akers (Eagle Rock, Cal.)
M. B. Albright (Long Beach, Cal.)
R. M. Alexander
J. E. Alford (Santa Ana, Cal.)
W. L. Allan (Alhambra, Cal.)
H. C. Allen (Ontario, Cal.)
Ralph Allen (Hanford, Cal.)
Walter Alvarado
Geo Anderson
J. H. Anderson (Gardena, Cal.)
Valdo Anderson (Pasadena, Cal.)
Albert Anix (Walnut Park, Cal.)
Mrs. E. L. Applegett
F. G. Archer
M. R. Armstrong (Alhambra, Cal.)
W. S. Armstrong (Alhambra, Cal.)
H. W. Arnold (Huntington Beach, Cal.)
L. A. Asay (Mentone, Cal.)
C. LeRoy Ashley (Glendale, Cal.)
R. L. Autry (Tujunga, Cal.)
S. J. Axton (Ventura)
Robert S. Bach (Ventura)
N. F. Backus (Long Beach)
J. Bailey (Inglewood)
W. O. Bailey (Ojai)
C. C. Baird (Inglewood)
Jack C. Baker (Santa Ana)
Ira W. Baldwin (Redondo Beach)
G. P. Baley (Tollhouse)
D. R. Ballmer (La Habra)
L. F. Ballmer (La Habra)
C. O. Banks (Visalia)
R. D. Bardsley (Ventura)
Byron Barett
J. Barker
M. B. Barker (Long Beach)
F. A. Barnard (Monrovia)
A. H. Barnhill (Santa Ana)
C. C. Bartlett (Long Beach)
L. A. Bartlett
F. S. Bartow (Tulare)
H. A. Beardsley (Long Beach)
John Beattie
J. W. Beck (Lomita)
R. W. Beers (Eagle Rock)
A. E. Beeson (Costa Mesa)
W. M. Beideman (S. Pasadena)
A. S. Bell (Big Creek)
Donald M. Bell (Redlands)
J. A. Bell
O. A. Bell
M. G. Bender
N. Benjamin
R. L. Bennett (Visalia)
W. K. Bercaw (Santa Paula)
C. N. Berry
W. C. Berry (Montebello)
H. W. Berryhill (Tulare)
S. B. Biddle, Jr. (So. Pasadena)
W. W. Bigbee (Whittier)
G. Haven Bishop
Paul D. Bishop (Monterey Park)
G. R. Bjorklund (Redondo Beach)
G. C. Blades (Glendale)
H. R. Blain (Kernville)
Frank Blaser (Ventura)
Theo. Blehm (Long Beach)
T. H. Bloomingdale (Monterey Park)

S. D. Blythe (Long Beach)
J. C. Bonar (Monterey Park)
R. W. Bordeaux
A. E. Boyd (San Gabriel)
R. L. Boyd (La Canada)
R. W. Bradley (Huntington Park)
G. Branscom (Lynwood)
A. A. Bray (Alhambra)
S. S. Brazelton
C. W. Bridges (Arcadia)
H. S. Brigden (Ontario)
Geo. S. Briggs (Lancaster)
S. A. Briggs (Ontario)
V. Bristow (San Bernardino)
R. E. Brooker
B. Brown (Azusa)
Glenn H. Brown (Alhambra)
M. A. Brown (Alhambra)
Ralph H. Brown (Glendale)
C. A. Brubaker
J. J. Bryan (Rialto)
H. M. Buchanan (Lindsay)
P. M. Buck (Big Creek)
A. C. Bugge (Alhambra)
O. R. Bulkley (Long Beach)
P. G. Bullington (Azusa)
L. C. Bunger (Bell)
R. A. Burke
R. W. Burrell (Hanford)
E. A. Burrows (Santa Monica)
Philip J. Burton (Hollywood)
C. A. Bush (Hollydale)
R. P. Bushey (Pasadena)
Gordon Cady (Ventura)
C. H. Calef (Pomona)
A. B. Callow (Long Beach)
James R. Campbell (Alhambra)
T. G. Campbell
C. D. Caroll (Ontario)
L. E. Carr
Sidney E. Carter (Belvedere Gardens)
E. E. Case (Delano)
Marvin Cate (Ventura)
W. B. Cheney
Jack Christensen (Kernville)
S. L. Christie (Alhambra)
F. E. Christopherson (Long Beach)
J. S. Chumley (Santa Monica)
C. R. Clark (Ventura)
H. F. Clark
Lee H. Clark (San Bernardino)
W. G. Clary (Redlands)
A. Stanley Clem (Santa Barbara)
K. B. Coble (Big Creek)
J. D. Cockrell (Alhambra)
Dave A. Coe (Redlands)
G. Franklin Coe (Downey)
D. O. Coffman (Tulare)
A. Colbert (Redondo Beach)
L. J. Colborn (Ontario)
Harry Coleman (Santa Monica)
Jimmie M. Coleman (Long Beach)
T. Coleman
John Collings
Jack Cooper (Bodfish)
M. E. Cooper (Long Beach)
Evelyn Copping (Pasadena)
Fred L. Corrigan (Ontario)
G. R. Cota (El Nido)
F. H. Cotteral
C. R. Coulter (San Bernardino)
R. L. Counts (Glendale)
R. B. Cowden (Big Creek)
C. M. Crawford (Long Beach)
C. J. Creasey (Long Beach)
E. J. Crom (Alhambra)
Irwin Crowther (Long Beach)
L. Cumins (Anaheim)
F. M. Curran (Santa Monica)
John Curran (Alhambra)
B. L. Curry (Tustin)
B. W. Curry (Ducor)
D. D. Cutting (Long Beach)
Durant L. Danielson (Santa Barbara)
Charles Davey
H. H. Davids (Redondo Beach)
H. E. Davidson (Alhambra)
J. Davies (Torrance)
W. G. Davis (Ventura)
R. M. Day (Santa Ana)
Wm. P. Day (Long Beach)
B. C. Dearing (Tulare)
G. E. Decker (Los Angeles)
W. Dettelbach
Roy Devalon (Pomona)
W. A. Devonshire (Pasadena)
Gus J. Diesslin (Hanford)
G. S. Dill (Graham)
H. H. Donkersley (Pasadena)
P. G. Donnel (Monrovia)
Ted R. Dooly (Redlands)
R. S. Dove (Long Beach)
D. L. Doverspike (Montebello)
H. J. Drexel (Santa Monica)
F. S. Duke (Porterville)
E. J. Dusthimer (Reedley)
C. H. Dyke (Ontario)
E. J. Eagan (Big Creek)
L. J. Earhart (San Pedro)
M. S. Earl (Santa Monica)
C. M. Earll (Sunset Beach)
L. J. Eastman (Glendale)
R. Ebey (South Gate)
A. G. Edginton (Big Creek)
F. N. Edmunds (Santa Ana)
L. J. Edwards (Colton)
Cecil E. Ellis (Monterey Park)
E. W. Ellis (Monterey Park)
H. N. Elmquist
J. Frances Emans
D. W. Emmons (Pasadena)
Everett Estee (Lindsay)
J. H. Ettmueller
E. B. Evans (Alhambra)
J. D. Evans (Long Beach)
W. L. Evans (N. Hollywood)
L. D. Fawcett
H. J. Fiedler
H. S. Fisher
J. M. Fitzsimmons (Long Beach)
A. J. Fleay (Bellflower)
Ben Fond
Ernest G. Ford
B. W. Fordham
Naomi Foster (Pasadena)
Robert Fouratt (Vernon)
Edgar Fowler
W. J. Fox (Ocean Park)
L. O. Francis (Three Rivers)
Miss Margaret M. Fraser (Pasadena)
Leon Freckleton
M. A. Frederickson
W. E. Frost (Ducor)
E. L. Fuller (Santa Barbara)
F. G. Fuller (Burnett)
H. N. Gallaher
W. E. Gamble (Temple)
L. G. Gansey
A. L. Gant (San Bernardino)
K. W. Gardner (Alhambra)
J. V. Garland
B. V. Garner (Upland)
C. A. Garrison (Pasadena)
Erwin L. Gates (Covina)
E. N. Geddes (Big Creek)
Theo. O. Gerlishe (Alhambra)
Miss Viola M. Getz (San Bernardino)
S. M. Gilbert (Wilmar)
A. M. Gilmore (Pasadena)
Paul D. Girardet (Glendale)
E. D. Golyer (Santa Ana)
Paul B. Good (Van Nuys)
Geo. Gorth
E. B. Gralewski (No. Long Beach)
Wayne E. Granger (Alhambra)
C. S. Graves (Upland)
E. J. Graves (San Gabriel)
J. H. Green (Alhambra)
R. A. Green (Hanford)
L. Groeneveld (Ventura)
M. Groner
John H. Grumbling (Van Nuys)
Wayne Guymon (Santa Paula)
E. E. Haller (Compton)
T. R. Hancock (Ontario)
G. Haniquest (Glendale)
Joe Hans
W. C. Hardester (Alhambra)
J. O. Harris (San Bernardino)
Thos. Harris (San Bernardino)
Don. W. Harrod (Santa Monica)
M. H. Hart (Porterville)
Chas. H. Harter (Santa Monica)
E. J. Hartman (Long Beach)
G. L. Harvey
Walter E. Hayes (Ojai)
W. S. Hearn (Long Beach)
Harry H. Heaton
M. E. Heberling (Visalia)
Miss Anna Helbig (Long Beach)
Frances Hendricks (Long Beach)
C. W. Hendrix (Santa Monica)
Harry Henze
Paul N. Hepburn
G. Heron (Arcadia)
V. E. Hett (Rosemead)
H. H. Heynen (Big Creek)
H. L. Hibler (Huntington Beach)
D. Highland
H. P. Hill (Alhambra)
Winnifred Hindley (Long Beach)
W. L. Hines (Long Beach)
C. E. Holcomb (Visalia)
Wm. L. Holley
R. W. Holmquist (Alhambra)
C. H. Holt (Ontario)
F. M. Holt (Newport Beach)
J. C. Hood (Santa Ana)
C. W. Hooker (Earlimart)
P. W. Hopkins (Huntington Beach)
Claude Horner (Ventura)
E. W. Horsley (Montebello)
G. D. Horton (Anaheim)
T. M. Hotchkiss (Monrovia)
Joseph Howard (Santa Monica)
C. T. Hoyt (Inglewood)
C. R. Hudson
H. R. Huffman
Homer L. Hughes (Long Beach)
Forest C. Hulbert (Santa Barbara)
Verda Humphreys (Ontario)
Russell G. Hunt (Inglewood)
H. O. Hutcheson (Lynwood)
C. O. Hutchings
George A. Isbell
F. A. Jackson (Porterville)
P. R. Jakway (Montebello)
E. R. Jenkins (Long Beach)
C. C. Johnson (Big Creek)
Miss Dorothy Johnson (San Gabriel)
S. E. Johnson
Sam C. Johnston (Ontario)
Glenn H. Jones
J. W. Jones (Fullerton)
J. Lloyd Kamm
N. A. Kanawyer (Delano)
Harvey Kanoff (Redlands)
J. J. Kaspar
J. M. Kaylor (Redondo Beach)
Robert F. Kelley (Redlands)
Robert Kelso (La Crescenta)
M. P. Kemerer (Huntington Park)
Roy S. Kendall (Redlands)
H. C. Kennedy (Upland)
Alyce Kettenacker (San Bernardino)
W. G. Keyes (Monrovia)
M. S. Kimball (Monterey Park)
L. H. King (Monrovia)
Victor King (Pasadena)
J. S. Kinkele
George H. Koch
E. D. Drachey
I. A. Kremer (Ontario)
N. O. Kunzler
W. M. Kyker (Alhambra)
W. T. Kyle (Visalia)
E. G. Lacey (Fullerton)
Frank LaFevre
C. W. Lafferty (Alhambra)
Miss Mabel Lair (Santa Paula)
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THE PRESIDENT'S PAGE

Mergers and Combinations

THERE seems to be a badly divided public opinion in respect of the mergers of operating companies and the combinations and groupings of holding companies now going forward in our industry.

Some people assert that the "power trust" is getting the entire country into its grasp, and hold that the only protection for the public is to do something drastic to the monster. Remedial proposals range from increased restrictive regulation to government competition with our industry or absorption of it. Others view larger units and groupings of units of our industry as a logical development, paralleling similar developments in other lines of business. The extreme of these views is set forth by Mr. Ford, who wishes for one country-wide system to produce the ultimate of efficiency, economy and use of product.

It is, perhaps, natural that the events which bring out such diverse views should be arousing comment, for they have come about rapidly and they are fairly sensational in size and scope. The implication, however, that their consequences should be evil is not borne out by results so far ascertained, or by conditions and circumstances in the situation.

Taking them on their lowest basis, power and light companies are concerns in business to make money. They have a very large investment. They can make money, not by limiting their product—electrical service—but by selling it. They can sell it only by making it commend itself to customers as to quality, price, usefulness. Their constant effort then must be to make service better and prices lower so that they may sell more service.

So long as they do this, their size is no detriment to the public interest but rather an aid to growth, development and further usefulness to the public. The situation is simple, logical, with no catch in it. It is the duty of the industry to demonstrate this by results which will speak for themselves.

MSSloan

President.

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FROM executives down, every man, woman and child in the electric business should have this thought firmly in mind, that he or she has a part in working out a vision so vast that no man can see it entire. As Mr. Edison has said, it is beyond our comprehension, just as the present development was beyond the comprehension of his early days.

Henry Ford.

International Good-Will

WHILE it was to be expected that the United States would respond in a most whole-hearted manner to the celebration of Light's Golden Jubilee, the plans that have been announced for its observance in foreign countries testify in a most agreeable way to the universal regard for Mr. Edison.

All of the countries to participate have themselves made very distinguished contributions to the development of electrical science, and for this reason their participation in the Jubilee celebration is all the more generous and appreciated.

Such international demonstrations are bound to have more than immediate significance, through the provision of excellent material for the culture of world-wide amity.

The electrical industry is fortunately situated to foster the cause of international good-will through the free interchange of experience in technical development, and the cultivation of friendships that develops from the personal contact of the delegates who journey to and from the several countries on missions connected with electrical progress.

The Way the Wind Blows

THE semi-annual supplement to "Government (Political) ownership and Operation and the Electric Light and Power Industry," recently issued by the National Electric Light Association, states that there are 1,440 cities and towns, with a total population of 2,999,615, where municipal operation has disappeared and the communities are now served from company distributing systems.

Of these 1,440 places, 14 are cities of more than 30,000 population, 19 are cities of 10,000 to 30,000 population, 40 are towns from 5,000 to 10,000 population, and 50 are towns from 1,000 to 5,000 population, while the remaining 866 places are hamlets of less than 1,000 inhabitants.

The records also show that 498 municipal systems, serving a present total population of 1,603,864, which at one time operated their own power plants, have sold or junked their generating plants to buy electricity wholesale from the systems of private companies. Of these 498 places, seven are cities of more than 30,000 population, 17 are cities of from 10,000 to 30,000 population, 36 are towns of from 5,000 to 10,000 population, 230 are towns of from 1,000 to 5,000 population. The remaining 208 are hamlets of less than 1,000 inhabitants.

It is unnecessary to be an expert mathematician to deduce from these figures the esteem in which municipal operation of electric utilities is held by most municipalities.

Talking-Movies

THE talking-motion pictures filmed at the Atlantic City Convention have proved a popular feature at every divisional and state Convention where they have been shown.

The *Electrical World* in commenting upon them, said: "The future use of talking motion pictures will undoubtedly revolutionize convention proceedings. . . . Their possibilities are almost unlimited, and the great rank and file of the electrical industry will be able to hear the messages of their leaders delivered in their own tones and with all their individual personality and forcefulness."

Since the reception of the movietone pictures has been so cordial it is very likely that other features of general interest to the industry will be filmed for presentation not only at sectional conventions but before meetings of company employees, clubs, and other organizations.

Reviews and Future Plans

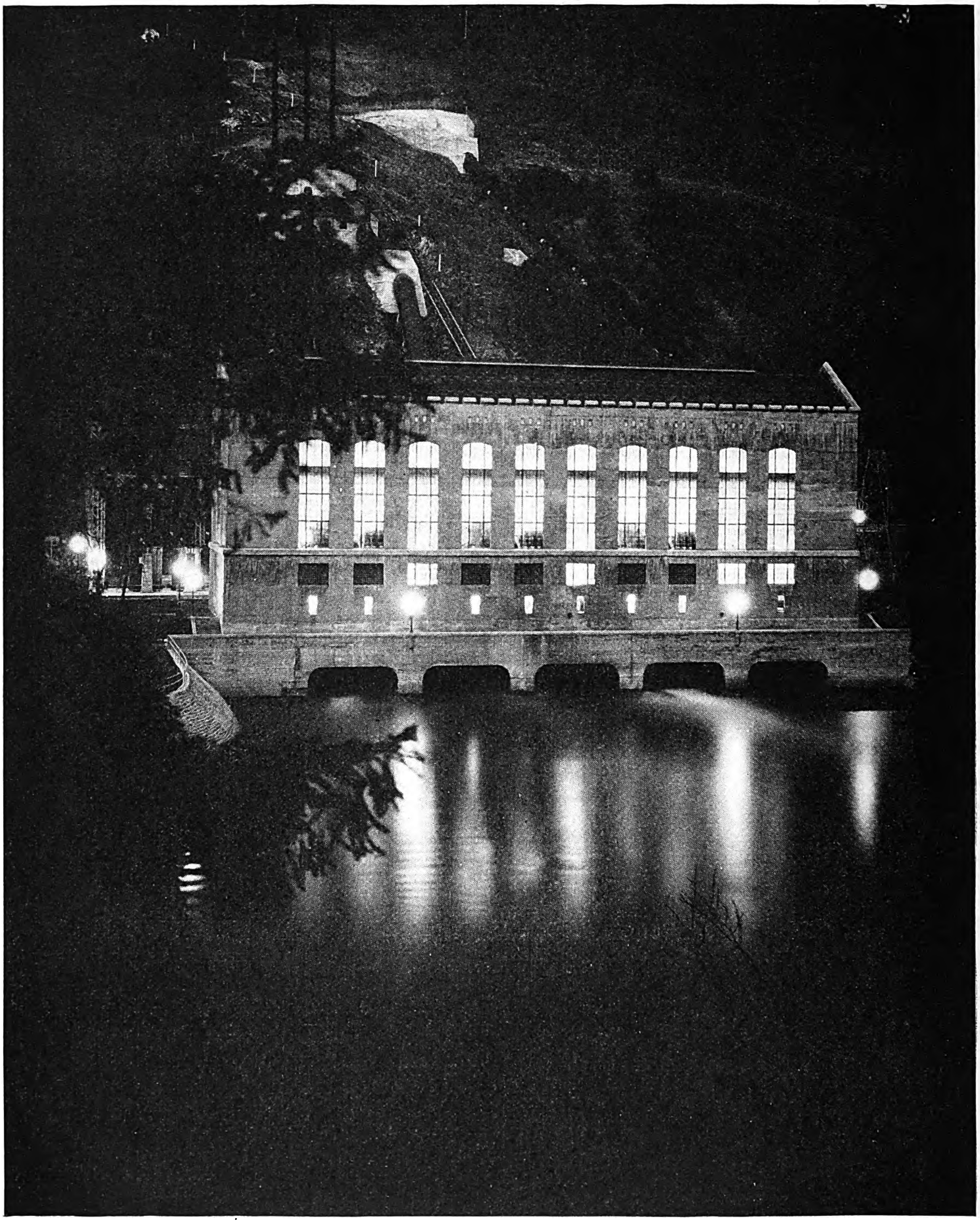
THE annual reports of the Engineering National Committee are for the first time printed in the N. E. L. A. BULLETIN instead of being published as convention reports, as in the past. These reports, which are summaries of the work of the several committees during the past administrative year provide not only a reference work for the use of the present and future members of the interested committees, but to executives, and to other interested persons who might not have had ready access to the reports, they give a fair picture of the important activities of the Engineering Section and the problems which they are encountering and solving.

It is expected that the committee chairmen will prepare for publication in an early issue of the BULLETIN a synopsis of work projected for the coming year. It is believed that by thus publishing the immediate plans of the committees better cooperation, and better coordination of work can be achieved.

Of First Rank Importance

AS the magnitude of the industry increases it becomes just so much more important that contacts with the public be of the most cordial nature. The size of most companies, with the corollary of varied personalities of the employees, necessitates a certain codification of public relations policies for the general guidance of the company personnel.

Admirable examples of such workable policies are given in the articles by Messrs. MacLeod and Vincent in this issue. The maintenance of good Public Relations will always be a matter of first rank importance to the electrical industry.



POWER HOUSES BY NIGHT

Pit 3 Power House, Shasta County, California, of the Pacific Gas & Electric Company

N·E·L·A·
BULLETIN

August, 1929

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Science and Progress in the Industries

By JOHN J. CARTY

THE unparalleled advances which have been made by the members of this Association in extending the benefits of light and power even to the most remote hamlets of the land, are due to many causes, scientific, economic, and administrative. You have made enduring contributions to the economic welfare of the country, which are destined as time goes on to bring about in our social and industrial life still greater improvements, the nature of which we can as yet only dimly perceive. Fifty years ago, service such as you are now rendering to the public was unknown; it did not then even exist. But today this service which you have organized is so vital that without it the present industrial structure itself could not exist. Behind all this lies a story of American enterprise, of administrative capacity, and of a public service effectively rendered, which is worthy of the admiration of all.

What History Will Show

The historian of the future, writing with that perspective and with that detached state of mind which comes with the lapse of time, will find in the achievements of the members of this Association material for one of the most interesting chapters in the history of American industry. While he will justly appraise the effectiveness of your organization, and the spirit of service which actuates your employees, he will show much better than can now be done how dependent is progress in your industry upon the advancement of science.

It has been said that, next to the verdict of history, the observations of foreign contemporaries are calculated to give a trustworthy estimate of the achievements, the progress, and status of a nation. There may be enough truth in this to afford some measure of justification for me, as an engineer outside of the electric light and power industry, in venturing to discuss some of the relations of science to the remarkable progress which you have made. I shall speak, therefore, as one interested in the advancement of science, but detached from your activities—commenting as an observer who has followed attentively the progress which you have made in your industry from the time of its inception.

General Carty, prior to his becoming Vice-President of the American Telephone and Telegraph Company in 1919 was Chief Engineer of that organization.

This address was made at the 52nd Convention of the National Electric Light Association held at Atlantic City, N. J., June 3-7, 1929.

Research in Applied Science

One of the outstanding factors in the success of the electric light and power industry is its encouragement and support of laboratories for research in applied science. In the operation of these laboratories, millions of dollars are expended each year, and thousands of men are employed, including engineers and scientists distinguished for their achievements in so many departments, including physics and chemistry. They have perfected generators, motors, transformers, and prime movers. They have made contributions to transportation, commerce, and industry. They have provided agencies for the advancement of medicine and surgery, and they have contributed in countless ways to the social welfare. Every individual, whether on the farm or in the office or workshop, whether at home or in a hospital or at church or in the theater, is receiving the benefits of these achievements. Whether traveling on land or at sea or in the air, our safety and comfort and ease of transport are dependent far more than is yet realized upon the work of your industrial scientists. Volumes would be required to show how their manifold products have transformed and enriched our daily lives.

But let me give a specific illustration which seems to be in a special manner appropriate on this occasion which marks the semi-centennial of the incandescent electric light, which was the invention of our great scientist and inventor, Thomas A. Edison. Let us go back only to the year 1907, which marks the introduction of the metallic filament lamp, and consider some of the progress which has been made in the electric lamp since that date.

By the year 1907 the improved carbon lamp, as the result of incessant scientific experimentation, had reached an efficiency giving an illuminating power of about 3 lumens (3.4) for each watt of energy employed. In that year, 1907, and as the result of profound research conducted by distinguished scientists in your industrial laboratories, a great forward step was taken in the introduction of the metallic filament lamp, which rapidly displaced even the best of the carbon lamps.

The tungsten filament lamp of 1928, which is the one now in general use, yields more than 14 lumens (14.5) per watt of energy. Thus it is more than 4 times (4.26) as efficient as the best carbon lamp of 1907, assuming in the comparison the same average size and the same hours of life.

Trustworthy figures show that in the United States alone, during the year 1928, the total expenditure by the public for lighting by means of the incandescent lamp was, in round figures, $600,000,000. If that same amount of illumination had to be provided by means of the best carbon light of 1907, then more than 4 times (4.26) as much electrical energy would have been required, and the bill for lighting which the public would then have to pay would be multiplied accordingly. The $600,000,000 would become $2,556,000,000. Were it not for the reduction in the cost in the generation and distribution of electric current which you have brought about since 1907, this figure would have to be increased by $300,000,000. From this it will be seen that the total reduction due to these items alone is now well over two billion dollars a year (2,256,000,000).

Improved Methods

This sum, almost incredible in amount, represents a cost reduction brought about by one of the products of the electric light and power laboratories—the modern tungsten filament lamp—and by the improved methods of generating and distributing current which your scientists have developed. These figures will grow larger each year, even though no further improvements should be made. They take no account of the savings due to the prices at which incandescent electric lamps and electrical machinery are now sold when compared with the prices of 25 years ago. Nor do they include any appraisal of the contributions which your industrial scientific research has made to the present unparalleled prosperity enjoyed by American industries.

These figures furnish the simplest method of emphasizing the progress which science has made in your industry in the generation and distribution of electric light and power. But taken alone they do not tell the whole story, for upon reflection it will be seen that without these reductions in cost a large proportion of the public now enjoying the benefits of light and power would be wholly deprived of the advantages which they now derive from your service. The remainder of the public which would still be carried on your books as customers, could not afford to use the electric current in such large quantities as they now do, and to employ it in such a great variety of useful and profitable ways.

The slowing down of the industrial and other activities of the country which would have resulted from such a curtailment in electric service, would connote an economic loss which it is impossible to state in pecuniary terms. Whatever it may be, the sum which represents the debt of society to your industrial scientific laboratories must be so large as to be almost incredible.

In endeavoring to appraise the value to the public of research in applied science conducted by your industry, I have employed a method which I have used in estimating in pecuniary terms the value to the public of applied science in the telephone art. On previous occasions I have given the results of these estimates, so that at this time I will only say that there, likewise, I have found that as a result of the scientific researches in the company laboratories, sums of money similarly great have been saved to the telephone users; while the service has been constantly improved and extended into every section of our country, and across the ocean, even now rapidly bringing the nations of the earth into speaking communication with each other.

Let me pause for a moment to mention the name of Alexander Graham Bell, the inventor of the telephone. It is only a few years since he passed away. If he were still alive, we can feel sure that he would be here upon this occasion to pay tribute to his friend and fellow-citizen, Thomas A. Edison, the inventor of the incandescent light, who is also the inventor of the carbon telephone transmitter, and the inventor of the phonograph. This unites his name in an especial manner with that of Bell. The one revealed the method of transmitting the human voice through the vastness of space, and the other, through the ages of time. As a long-time friend of Mr. Edison, and as one who so greatly admires his genius, I wish that I could adequately express my appreciation of his achievements. This I could hope to do if I could speak in the eloquent language that Bell himself would use. But it is not within my power to put in words the message which one of these immortals would give to the other. It gives me great satisfaction to be able to join with so many millions of others in honoring Mr. Edison and adding to their's my own congratulations and felicitations.

Practical Results

The scientific industrial research conducted in your laboratories is often called "research in applied science." Applied science must submit its findings to the criterion of utility. It must produce practical results, things that can be used with advantage, perform new services, or bring about new economies. It must continue to pay for itself and yield a profit. Otherwise it must cease. The figures which I have presented and the evidence which I have submitted, abundantly prove the extraordinary value of the researches conducted in your laboratories. Your applied science does pay for itself, and more. Your industry could not exist without it. You cannot allow it to cease, and you will continue to prosecute it with ever-increasing success.

But I have already said so much, and there is so much more that could be said, showing the importance of scientific research conducted for the sake of utility and economy, that there is danger of losing sight of another form of scientific research which has for its primary object neither of these things. I refer to scientific research conducted purely for the sake of extending the boundaries of knowledge, discovering the laws by which nature operates, and determining the principles of mathematics, astronomy, biology, chemistry, and physics.

Pure scientific research is conducted with a philosophic purpose, for the discovery of truth and for the advancement of learning. Investigators in pure science may be likened to explorers who discover new continents or islands, or hitherto unknown territory. They are continually seeking to push forward the frontiers of knowledge. Their work is conducted without any utilitarian motive, for as Huxley says "that which stirs their pulses is the love of knowledge and the joy of discovery of the causes of things . . . the supreme delight of extending the realm of law and order ever farther toward the unattainable goals of the infinitely great and the infinitely small, between which our little race of life is run."

The pure scientists are the advance guard of civilization. By their discoveries they furnish to the engineer and the industrial chemist and the other applied scientists the raw materials to be elaborated into manifold agencies for the amelioration of the condition of mankind.

Let me illustrate this by the work of Scheele, a Swedish scientist, who in 1781 made a fundamental discovery respecting tungstic acid. He furnishes a classic example of the motive and achievements of the investigator in pure science. Aside from his pioneer work in tungsten, independently of Priestly, he discovered oxygen. He also discovered manganese, chlorine, barium, and molybdenum. Truth, not utility, was his criterion, for in one of his letters, he said: "It is the truth alone that we desire to know, and oh, what joy there is in discovering it!"

Subtract from our present stock of scientific knowledge the body of truth which he contributed, and applied science as we now know it would be dwarfed, and it is impossible to imagine what would be the backward state of the industries based upon it.

Workers in Pure Science

Growing out of the discoveries of Scheele and inspired by his example, two of his pupils, the brothers d'Elhuyar, were the first to isolate and produce metallic tungsten. Were it not for the knowledge gained by these researches in pure science, the very existence of tungsten would be unknown. The tungsten filament lamp would be an impossibility, and the manifold benefits and economies which the public now enjoys as a result of its use, would not be realized. As to the effect of this upon your own industry, you yourselves can make the best conjecture.

Let me give some other examples of the results which have ultimately followed from scientific researches conducted only for the purpose of discovering new truths or principles.

In the early part of the last century, Hans Christian Oersted, Professor of Natural Philosophy at the University of Copenhagen, made the great discovery that an electric current flowing in a wire could move a magnet; and less than one hundred years ago, Michael Faraday, conducting researches at the Royal Institution in London, discovered that a moving magnet could generate a current of electricity and that one current could generate another. Joseph Henry, a Princeton professor, and later Secretary of the Smithsonian Institution, independently of Faraday, discovered the laws of current induction. He also made other fundamental contributions to our present stock of scientific knowledge.

This list could be extended at very great length, giving the names of thousands of investigators in the domain of pure science who have contributed knowledge which is indispensable to modern industry and to applied science in all of its branches.

But let us consider the incalculable benefits which the whole world has derived from the knowledge of scientific principles and laws contributed by only three of these great men—Oersted, Faraday, and Henry. If we did not have this knowledge, the electric telegraph and the electric light would be unknown; neither Bell nor anyone else could have invented the telephone; there would be neither dynamo nor motor, and your industry would never even have been thought of; your Association would not exist; and we would not at this time be celebrating the great achievement of Edison in the invention of the electric lamp.

The Future

I have stated in terms of money some of the debt which we owe to your own workers in applied science; but it would tax the powers of the human mind to estimate the prodigious sums which have been added to the wealth of nations by the contributions of the investigators in the field of pure science seeking only to discover the truth.

I have spoken of the past, and now let me speak of the future. There are countless practical problems now confronting mankind which never can be solved by the applied scientist in the present state of scientific knowledge. He must await further fundamental discoveries and new scientific generalizations yet to be furnished by the investigator in pure science. Unless the work of the pure scientist is continued and pushed forward with ever-increasing energy, the achievements of the industrial scientist, in the course of time will become more and more restricted. Already the applied scientists have perfected your dynamos and motors and transformers, so that they are working at 95 per cent of their theoretically perfect efficiency.

Stock of Knowledge

While without any increase in our present stock of knowledge in the realm of pure science, the applied scientists would find abundance of profitable work to do, nevertheless in the long run they can proceed no faster than the discoveries of pure science permit. It is of the greatest practical importance, therefore, that we should do everything in our power to encourage and support the work of the pure scientists who are to be found in all of our universities and scientific institutions. The discoveries made by these learned men have no immediate practical value, and could not therefore bring to them or to their institutions any pecuniary return. Unlike applied science, pure science cannot support itself. It must depend upon contributions of money from the public, from far-sighted patriotic citizens and men of affairs; from business and commerce and the industries which derive their prosperity or very existence from this field of human endeavor.

The possibilities of research in pure science are boundless, because the resources of nature are without number. Great as are the scientific accomplishments of our day, they are small compared to the possibilities of the future. Two centuries ago, Sir Isaac Newton, the discoverer of the law of gravitation, who ranks perhaps as the foremost scientist the world has ever known, expressed his faith in the infinite possibilities of science in these words: "I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."

The scientific developments since the time of Newton so strikingly confirm this vision of the great philosopher that we can feel certain that, if pure science is properly supported, the discoveries of the future will be enormously great in comparison to those which have already been made. Future generations of Americans may look upon us with our present limited knowledge of the forces of nature, as we now regard the American Indian, who, cold and shivering in his scanty clothing, was ignorant of the coal at his feet, with its stores of heat and power.

Constitution of Matter

Although seriously hampered and restricted by the lack of funds, American investigators in pure science are pushing forward their work with courage and determination. Among the thousands of problems which occupy their attention, they are attacking the most fundamental of all—the ultimate constitution of matter, the structure of the atom, and the nature of the electron. On the summit of Mount Wilson in California, the astronomers are observing in the sun and in the stars and in the nebulae not only worlds in process of evolution, but what is most astonishing, the evolution of the chemical elements themselves. In laboratories at the base of the Mountain, chemists and physicists are attempting to reproduce, with increasing prospects of success, conditions which have been discovered in the depths of the universe. They are splitting the atom into its parts, and their work is filled with the greatest promise. From it I believe science will some day learn how to take the elements apart, and put them together again in new and most remarkable combinations. Already they have found that in the depths of space, hydrogen is being transmuted into helium, oxygen, silicon and iron. They have discovered that the material substance of the faint companion star of Sirius has a density of one ton per cubic inch; while a cubic inch of the material composing another faint star recently studied at Mount Wilson may weigh as much as seven tons.

I believe that in the course of time, if these investigations can be carried forward to success, our applied scientists will be able to provide new structural materials and metallic alloys, lighter or heavier, as may be desired, cheaper and more durable and capable of resisting corrosion. Researches such as these should be multiplied a thousandfold. They will give us the answer to the great problem of drawing upon new sources of energy, and of utilizing those already available with the highest economy and efficiency. No inquiries could go more deeply to the foundations of industrial progress than these, and none could hold forth such promise of continued prosperity and of such advancement in all human affairs.

If there were time to do so, I could show the necessity for conducting pure science research not only in those fields which I have already indicated, but I could explain why it is essential to prosecute such researches with the utmost vigor, in every department of science without any exception whatever.

Because it was convenient, I have stated some of the results of science in terms of money. But the value of science can best be measured in terms of human achievement, the mastery of the forces of nature, the elimination of poverty and disease, the prolongation of life, the advancement of learning, the growth of right living and sound thinking and of good understanding among men. Pure science research is indispensable to the attainment of all of these ends. According to the present vision of science, life must no longer be regarded as a struggle among men for a limited store, where one man's gain or one nation's gain must be another's loss. Under the banner of science, we are asked to join with our fellowmen working together in controlling and utilizing the bountiful forces of nature.

"Science," said Pasteur, "is the soul of prosperity of nations and the living source of all progress." American business and commerce and industry and the whole of the American public are being asked to give and to continue to give to pure science research, in our universities and elsewhere, that support which it so greatly needs. For all the benefits which it is conferring upon us, science asks only that we provide its zealous workers with an opportunity to multiply their efforts in our behalf. Upon the answer to this call depends the future prosperity of the nation.

Countrywide Activity in National Food Preservation Program

ACTIVE work in development of local Food Preservation Programs has been a feature of the past month in the National Food Preservation Program, the movement for public education in the need for proper refrigeration. Local Councils in a large number of cities in all parts of the country have completed their organizations, and requisitions for tie-up materials from a number of other points show that active work is also under way there.

One of the most pleasing aspects of this early activity in the Program is the unanimity with which all factors concerned in the problem of food preservation have joined forces in making the work of the Local Councils successful. Ice manufacturers and distributors, makers and distributors of ice-cabinets and all kinds of refrigeration machines, dairies, meat distributors and organizations and individual firms which are concerned with food distribution; public health agencies, women's clubs and civic organizations have all responded to the invitation of the National Food Preservation Council to participate in this movement.

Regional Directors have been, in nearly every instance, taking leaves of absence from commercial work in order to travel throughout their territories and perfect the local organizations. National Headquarters of the Program has also sent trained organization men into the field to assist the directors in this work, and aid the Local Councils in getting started to function properly. City chairmen have been very unselfish in devoting their time to this undertaking, and pushing it in their localities.

National Magazine Advertising of this Program is already in the hands of publishers, and will appear in a steady stream in September magazines, which will reach the public between August 10—when the September issue of Cosmopolitan reaches its readers—and September 12, when the second of the two advertisements in *The Saturday Evening Post* reaches the news-stands.

The magazines, in addition to the educational matter about food preservation, pointing out the necessity of keeping foodstuffs at an average temperature below 50 deg., and above 32 deg., fahr., will contain announcements of the $25,000.00 National Idea Contest. This contest, in which 835 prizes ranging from $10,000.00 down to $5.00 will be awarded, is expected to produce a greatly heightened interest in the subject of food preservation. To aid its work of education to the greatest possible extent, a book written by Mrs. Elizabeth Stone MacDonald, widely known authority on home economics, giving a detailed picture of the subject and explaining the contest, has been prepared. This booklet will be distributed by Local Councils, and local participating agencies, and readers of the national magazine advertisements will be referred to these local sources, and advised to secure a copy of this booklet through them.

The essays are to be headed, "Why 50 Degrees is the Danger Point," thus making each of those who sends in a reply a student of the requirements of proper food preservation. How many will be interested in this Program by the National Idea Contest may be judged by the records of past contests. The National Essay Contest of the Laundryowners National Association, two years ago, was participated in by more than 1,000,000 women, and those familiar with that contest declare that there were undoubtedly many more who made a study of the working of the laundry, and prepared to enter the contest, but did not do so.

Because this Program is receiving local publicity the results of this contest should be even more impressive. The influence of the contest in building public interest in refrigeration and food preservation, too, can be greatly enhanced by holding local contests, with local prizes, correlated with the National Idea Contest. Plans are being made by a number of Local Councils to hold such contests as part of their public activities in the September drive on public opinion.

The movement is one which should receive support, not merely because of its commercial possibilities, but because of its civic value. The problem of food spoilage, and disease and wastage brought about by careless methods of handling perishable food, is one of very serious proportions. The endorsements which have been received from national associations which are interested in the problem of supplying the nation's food stuffs—the latest of which is the United States Fisheries Association, Inc.—testifies to the vital need which is felt for education in this direction.

Complete Service

Ideals and Accomplishments of the Public Relations National Section

By MARTIN J. INSULL

JUST about ten years ago, a committee of the Investment Bankers Association reported to its convention as follows:

> **"In previous reports your committee has referred to the advantages which would accrue, both through the development of cordial relations between the utilities and their customers and through increased confidence of investors in public utility securities, from the dissemination of more complete and comprehensive information concerning the economics of the public utility business. A public fully and correctly informed will offer sterile ground for the arts and deceptions of the demagogue."**

As we look back, it is evident that, at the time this report was written, the relations between the operating companies and their customers were not entirely cordial; nor was there a complete confidence in public utility securities on the part of investors. The industry as a whole was not informing the public in a complete and comprehensive way about its business.

A Criticism of the Industry

This was a criticism of the public utility industry. It was not the first one, and in order to impress upon the industry that it was being criticised and to make that criticism, though polite, as severe as possible, the committee called attention to the fact that this matter had been referred to in previous reports.

While this report was not the only cause, it was one of the causes that made the industry give some serious attention to more fully informing the public about its business. By this and similar indications, the industry was brought to realize that, in its preoccupation with financial problems and urgent construction and operating responsibilities, it had been overlooking the important duty of keeping the public informed of its activities.

Toward that end, the National Electric Light Association, at the convention of 1920, authorized the formation of the Public Relations National Section. How necessary that Section was at that time is indicated by the Investment Bankers' report from which I have quoted. The Public Relations Section has proved its continuous value by the changed attitude of our customers and of the public in general toward our industry, and that of the investors toward the securities of our industry. You seldom, today, hear of any trouble between operating companies and their customers, indicating that "cordial relations" have been developed. The headlines of the financial pages of the daily press bear evidence to the "increased confidence of investors in public utility securities." The public as a whole has received "more complete and comprehensive information concerning the economics" of our business largely as a result of the work during the past nine years of the Public Relations National Section, the direction of whose activities now rest in the hands of those here today.

Mr. Insull, President of the Middle West Utilities Company, was President of the National Electric Light Association in 1920-1921 and served as Chairman of the Public Relations National Section during 1921-1922. This address was delivered at a meeting of the Executive Committee of the Public Relations National Section held at Chicago July 17

A Great Responsibility

You have assumed a great responsibility, because upon you rests very largely the success of a great industry. That success can only be assured by a favorable public opinion, which, if properly informed, cannot be anything but favorable toward an industry upon which the business and social progress of the nation so largely depends. It is the section which you direct that has the duty of so informing the public in every honest way that you can devise.

In devising and applying the various means of cultivating well informed public opinion, you not only broaden your own knowledge of the industry, but you are at the same time educating the army of men and women employes to a broader and better service to the public, which in itself tends to intensify that favorable public opinion upon which the success of the industry so largely depends.

Complete Service

We all agree that good service is the prime requisite. But service must not stop at the lamp socket or the motor. It must, in addition, carry with it a well-informed personnel that can intelligently answer the inquiries of the public—a personnel trained to understand that their gratuitous personal service to the customer is just as important to the success of the industry as the operating efficiency which it is the customers' right to expect. Not just a silent utility service, but a human service. Not a "public be damned" service, but a "public be pleased" service. There is no maudlin sentimentality about this. It is just good business. We are in business to succeed, not to fail. We cannot succeed unless we have the good will of our customers, the public, because the investor on whom we depend for capital with which to carry on our business is not going to invest in a business to which the public is antagonistic.

It was certainly evident from the report from which I have quoted that public relations work was necessary, and as the public in the natural course of events, is always changing, public relations work is and will always be necessary. We must never stop informing the public and educating ourselves and our employees in the fundamentals of our industry.

As to how successful our work has been, the effects on the public mind of the investigation now being carried on by the Federal Trade Commission is some indication. With the exception of the sensational press and in spite of their exaggerations of the occasional mistakes that have been uncovered and their disregard of all the great constructive work of the industry, very little interest has been displayed by the public at large in the investigation. Certainly the investors' confidence in the industry or its management has in no way been shaken. We cannot assume that this would have been the case had it not been for the informational work of this important Section.

How much criticism of faulty service do we hear? How much complaint or dissatisfaction at that all-important point of contact between the operating company and the public? How many instances do you know of complaints about rates by the people actually paying those rates? I see little sign of any quarrel in these relationships. What I do see is a fictitious struggle between a mythical "consumer" and an abstract "power trust" which does not exist.

A Big Job Requires Bigness

This is a strange and paradoxical situation but it must be dealt with. To a large extent, it is due to this—the public fails to connect up the local company, which it regards highly, with this somewhat mysterious electric industry that it reads about in the papers. Can't we show them the simple fact that the electric industry as a national institution is simply the sum of all the neighborly people who furnish their electric service locally? Its bigness is simply the bigness of our nation. You remember the famous remark of Speaker Reed of the House of Representatives back in the nineties. Somebody was shocked to find that Congress had appropriated a billion dollars. Speaker Reed answered simply, "This is a billion dollar country." Today it is a bigger country than ever. If people keep that in mind they will see no evil in the mere bigness of our business—they will realize that it must be big to do the big job it is responsible for.

Why Shouldn't Government Ownership Be Opposed?

A great deal of attention has been given by the investigators to the industry's opposition to governmental ownership and its informational work along that line. Why should not an industry responsible for so much of the money of the saving and thrifty people of the country defend that investment to the best of its ability against attacks by proponents of the government entering the business? Is there any other position that the men of the industry on whom the public rely for the safety of their investment could take, feeling that every effort towards government ownership and operation points toward a general scheme for the nationalization of the whole electric light and power industry?

It is certainly within the rights of the industry to assert its belief that government should do only such things as the people cannot do for themselves; that government has no business going into business, and that the continual encroachment of government in all lines of business will ultimately undermine this country's wonderful experiment in democracy. The very newspapers that criticize the electric light and power industry would be the first to loudly complain if the government went into the newspaper business, or even attempted to regulate its service and its profits. The unfortunate thing is that business as a whole stands idly by while the government goes into the other fellow's business, overlooking that theirs may be the next attacked. Has not the time arrived when all business should combine to make it thoroughly understood in this country that the proper function of government is to govern business, not engage in it, and that industry has the right to protect itself against such a course by any honest and truthful means that it can use? Should the leaders of industry be condemned for their efforts to protect from such attacks the capital for which they are trustees?

A Right and a Duty

The electric light and power industry should be opposed to government ownership and operation not only of its own, but of all other industries, and it has the right and it is its duty to take that position before the people in every legitimate way. This country has been built up on private initiative, ownership and operation until it has reached its present preeminent position as an industrial nation. Should it now, while other nations are turning toward its method of development, reverse itself and embrace government ownership and operation of industry which they, as far as they are able, are discarding?

Every effort should be made to efface from the public mind any misunderstanding with regard to the industry's activities in the schools and colleges. Our educational efforts in the schools have been purely factual and have dealt only with the physical and economic aspects of our business. They have been directed toward supplying the coming generation of business men and women with a better understanding of the public utility business. Our business differs from the businesses with which most people are familiar. It has a very slow capital turnover—once in five to six years—while many others turn their capital five or six times a year. For this reason it cannot supply increased facilities out of earnings and is, therefore, constantly in the market for its new money. It is a natural monopoly because the duplication of service would mean an economic waste of large proportions. People are naturally opposed to monopolies, and especially so if they do not understand that there are real economic reasons therefore. Toward the end that there may be future utility leaders educated in some of the fundamentals of the business, we have fostered courses in public utility management, economics and financing in some of the schools of commerce of our universities. As these great services must be carried on, surely this is in the public interest.

A Correct Public Understanding

Undoubtedly in a national informational campaign on any subject, some details unfortunately will creep in that can be criticized, and especially at a time when those opposed to it are looking for things to criticize. But there is nothing wrong with the fundamentals of the utility industry's effort to inform the public regarding its important position in the social and business life of the nation. In fact, one of the great dangers today is that certain lines of business are outgrowing public understanding because of their size alone. Such businesses can offset this only by using every means in their power to bring about a correct public understanding. It is this that the Public Relations Section should do for the electric light and power industry.

It is, perhaps, difficult to distinguish between information as a duty to the public and information as sheer selfishness. Both motives, as it happens, would in most cases lead a business to the dissemination of the same facts, for it is generally true that a business must take the same stand in stating what is best for the public as it would take if it were stating simply what is best for itself. All this means is that the business has so shaped its policies that its interests are consistent with the public interest.

Better Business Ethics

Fortunately, during the last thirty years we have seen a beneficent change in the ethics of business, our own included. The day of business for profit only and the spirit of "let the buyer beware" is largely a thing of the past. Today we have a much higher spirit of business—the spirit of service to the public, humanitarian treatment and fair wages for employees, good working conditions and provisions for old age and for dependents. The outcome of these changes has been public appreciation of the principle that capital invested in business—which, as a matter of fact, belongs to the public—is entitled to fair wages. The public now realizes that it cannot receive good service from a starved corporation. This has brought about a far better understanding between large business enterprises, their employees and the public. A mutual confidence has been built up.

Business must do everything possible

(*Continued on page* 544)

Martin J. Insull Prize Paper

A Public Relations Yardstick

By ROB ROY MACLEOD

"I wud the Laird the giftie gie us
To see ourselves as ithers see us."

AND, after all, we can build public confidence—good public relations, if you prefer—only when we are honest with ourselves; when we see ourselves as others see us. Character in an individual or an institution merits and receives respect. It is the result of searching out weaknesses and eliminating them.

Flattery is the most pleasing—and most useless—thing in the world. It serves no useful purpose, but, on the contrary, blinds us to our faults and weakens character. It makes us, like the ostrich, hide our heads in the sands of complacency, and failing ourselves to see our faults, believe that others cannot see them. Self-flattery is a false friend to an industry which is seeking better public understanding.

If this discussion seems inordinately critical, if it seems to older and wiser heads than that of the writer that it is too idealistic, please remember that it is critical and idealistic only in the hope that it may be a helpful contribution to the industry. The writer is fully aware that fools rush in where angels fear to tread.

So much for the preliminaries. Now let's roll up our sleeves and go to work.

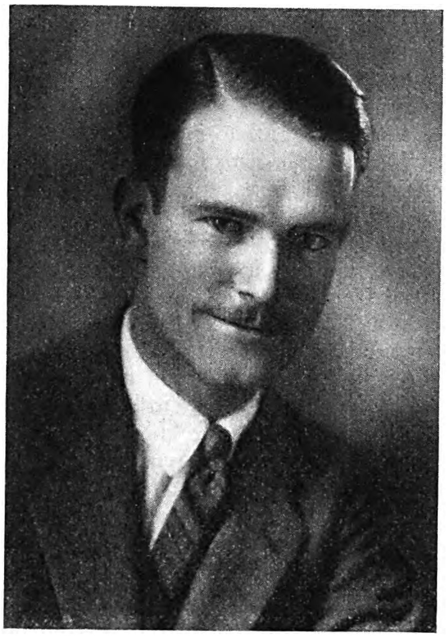
Electric service is possible because of five factors—stockholders, management, employees, customers and plant. All are equally important; all have certain responsibilities.

We shall, in this discussion, take up each factor in turn and consider its bearing on public relations. We shall set up an ideal—a yardstick by means of which each one of us can measure his own organization and determine how far short of the ideal it falls. Having found our weak spots, having seen ourselves as others see us, we can build character in our institution, build public confidence, build good public relations.

THE STOCKHOLDERS

Customer ownership was not a step toward better public relations—it was a flight of stairs.

Every company should be interested in the widest possible distribution of its securities among its customers. More than that, it should be active in securing that distribution. One who is financially interested in a company is deeply interested. Where his dollars are his allegiance goes—provided that everything possible is done to safeguard his dollars and make him proud of his allegiance. But the industry is too well sold on customer ownership for us to dwell longer on its merits.



Mr. MacLeod's paper won the Martin J. Insull prize award for 1928-1929. Mr. MacLeod is manager of the Publicity Department of the Buffalo, Niagara & Eastern Power Corporation. He was a graduate of Boston University in 1923, with the degree of Bachelor of Business Administration.

How may we secure wider customer ownership?

Investment departments should be maintained by the larger companies. Here Mary Tapp, the typist, and Joe Piccard, the laborer, may buy securities on the instalment plan. Here the uninformed investor may learn the difference between bonds and preferred stock. Here the widow with her small insurance fund may bring her investment problems and receive courteous, considerate treatment.

The investment department may render a splendid public service to the small and the large investor, particularly the former, by exposing the fraudulent stock promotion and bringing about the safe investment of funds in the fourth largest industry of the country. The small investors' dollars and favorable opinions are just as valuable as those of the wealthiest citizen. In fact, a large number of small stockholders is more to be desired than a small number of large stockholders for both financial and public relations reasons.

Smaller companies must use other means of spreading customer ownership. There are two leading methods—through employee campaigns and through cooperation with banks or brokers. When these methods are employed, strict control is necessary.

Employees, in a brief campaign, cannot be converted into full-fledged security salesmen. They can, however, be given the essentials and kept from waxing too enthusiastic in their statements. Customers should not, for example, be given the impression that a preferred stock with a fixed dividend will appreciate in value with the development of the company as an equity stock would. Misrepresentation, whether intentional or unintentional, can breed only ill-will.

Outside agencies, brokers or banks—sell securities for one reason only—profit. If they are to function as an investment department for the electric light and power company they should understand definitely the company's policy in customer ownership—straightforward statements of fact. Not even "shrewdness" is permissible. And a partial payment plan should be offered, by all means.

Very well, we have secured our customer stockholders. What are we going to do about it? Shall our entire contact with them be limited to a dividend check four times a year? Decidedly not.

With each dividend check we send a brief printed message. It may be the quarterly financial statement, the announcement that a new office, substation or store has been opened, the story of a large new industry added to the lines or any fact of interest to them.

Every year we send them our annual report, containing complete financial statements and an account of our stewardship of their property during the year. In this we display a map of our territory, we point out how sales have increased and earnings with them, we tell what we are doing to stimulate the development of our business, we tell about the part we play in human progress, and we reiterate our public policy.

Every month we send them a tabloid newspaper giving them the intimate details of what is going on in their company. A new line is built here, new equipment is added there, a tax bill of so many thousand dollars is paid, a lineman uses prone pressure and saves a child's life—and so it goes.

But that is not all. Every new stockholder who joins the family receives a personal letter from the president—not a mimeographed letter, but one written on the automatic typewriter and actually signed by the president—welcoming him, enclosing a copy of the last annual report and stating that he will receive the newspaper every month. Furthermore, he is told that criticisms and suggestions will be welcomed, and that questions in regard to the company will be answered promptly.

Now we come to the annual meeting. Our stockholders get the notice required by law, in all the glory of its tortured legal English. They also get a letter from the president, whether they live in our town or Timbuctu, urging them to attend the meeting. Of course, many of them can't come, and so they send in proxies. We acknowledge their proxies and thank them for the confidence which they have in us. We tell them that the action of the meeting will be described in the next issue of our newspaper.

At the meeting those who attend see the men who are responsible for the management of their property. The officers and directors become creatures of flesh and blood rather than mere names. The president, in a brief talk, does even more to personalize—to humanize—that mysterious thing we call the company.

Will our stockholders be enthusiastic? Will they give us that most valuable of all publicity—word of mouth advertising? Will they help us build sound public relations?

THE MANAGEMENT

The typewriter with which this was written was an ugly lump of ore. Man made it into a useful machine.

An electric light and power company is a corporation, "an aggregation of individuals, having the legal right to sue and be sued," as we were told in the economics class. Management makes it a glowing, living thing—a vital public servant.

Great are the responsibilities of management! It must coordinate the capital supplied by the stockholders, the efforts put forth by the employees and the physical facilities of the plant to provide service—good service at reasonable rates—to the customers. Management is the keystone of our arch.

To the management we must look for our public policy. From the management, to a large extent, the institution draws its character. Are the men at the helm broad-visioned, honest, community-minded, straightforward and trustworthy? So is the organization. Are the men at the helm narrow, shifty, selfish, subtle and undependable? So is the organization. The future of the electric light and power industry depends entirely upon the character of the men who control the destinies of the individual companies.

The ideal electric light and power company executive may easily be described. He is a man of vision. He sees his company as a contributing factor in the progress and prosperity of the communities which it serves. He takes an active interest in public affairs and is looked up to as a civic leader. There is no smirch on his record in either private or public life. He is not barricaded behind mahogany walls and guarded by a hydra-headed monster in the guise of secretary, yet everyone knows his time is not to be wasted on trivial matters.

He is absolutely reliable, and a promise which he makes is always fulfilled. He is courteous and considerate of everyone, yet he knows how to say no, and mean it. The policies he lays down and the orders which he issues are reasonable and just. He realizes the power which is vested in him and uses it for the good of his community and his company. His men are proud of their captain, for he knows how to praise as well as how to criticize.

No such man exists? Yes, indeed! This writer knows four such men in the industry from his own limited personal experience.

When management is composed of such men, the institution assumes its character from them. Such an institution merits and receives public respect and enjoys good public relations.

THE EMPLOYEES

Marvelous has been the increase in efficiency of steam and hydro-electric plants. Remarkable has been the development in the art of transmission. New machines, new controlling apparatus, new ways of doing things—the electric light and power industry in the last few years has written a vital chapter in American industrial history.

We have done wonders with stone and steel, with copper and concrete. The part which they play in our work is subject to engineering attack—we figure the stresses which they will stand on slide rules, we study their characteristics and calculate mathematically how we can use them to greatest advantage.

The human element in our industry—employees—cannot be reckoned with such nice precision. Our slide rule fails us; our mathematics are set at naught. The waste of man power—and it goes on in every industry—is tremendous.

Could we stimulate only one-half the latent brain power in the employees of our industry, we would unleash a stagnant resource fully as valuable as the water power of our country, its petroleum reserves, or its coal deposits.

What shall we do to reach this rich mother lode which lies buried in our own back yards? We must inculcate our public policy into every employee, inform him fully in regard to our company and our industry, make him our enthusiastic representative in all his public contacts and stimulate him to think constructively.

This is a large order, but we shall fill it because we know it can be done!

We must have an Employees' Relations Department—although in smaller companies it may be a single individual—as a clearing house for this important work. Here all messages from the management will clear, here employees' records will be kept, here accident prevention work will have its origin, here employees may bring their financial, occupational—yes, even marital—troubles. This department will be generally responsible for getting our message across to our employees.

In the construction, operating, engineering, accounting and similar departments, where employees have comparatively little contact with customers during working hours, we hold regular get-togethers for the foremen and other pivot men. We sell these men, and if we do it well they sell the men under them.

Cashiers, meter readers, salesmen, clerks and other employees who meet our customers daily have different problems and require different treatment. For them we conduct meetings at which officers and key men of our company appear as speakers and deal specifically with their problems. Perhaps some members of the first group evince such a lively interest that we bring them into the second group for more intensive training. Thus we discover a line foreman who can double his salary—and his usefulness to us—as a salesman.

We cover the same subjects with each group, but we go into greater detail with the second, for it contains most of our public contact. We outline our public policy, tell how we regard our job as a public service company. We explain how we are manufacturers, wholesalers and retailers, all in one at a single profit, and how we are closely regulated by the State. We stress the importance of courtesy and consideration in dealing with customers, and tell every employee that we expect him to live up to the company's policy. We prove the value of favorable public opinion, and show each employee that he must cooperate in our effort to secure it if he is to grow in our organization.

Public speaking classes are organized from the outstanding members of these two groups. At our first meeting the president tells the members that they have been selected to carry the company's message to its customers, and that they are to be trained as speakers for that purpose. Then at alternate sessions we explain financing, rates, generation and distribution, and the more intimate details of the company's operation, followed by a study of the art of public speaking. At the end of fourteen or sixteen weeks we have a trained corps of public speakers, thoroughly qualified to discuss our business before church, civic and business groups.

Today everyone dresses neatly—it is required by present-day standards, and our employees know it. Some, however, must wear uniforms and we must sell them the idea. We must convince them that our object is not to turn them into liveried servants, but to protect our customers from fraudulent meter readers and inspectors. We point out that a uniform is simply a mark of authority and that without it the traffic cop would risk life and limb as other pedestrians do.

Our Employees' Relations Department sees to it that every employee is also a stockholder. We offer employees a special stock plan, and we save twice the concession which we make in market price through the reduction of labor turnover. In combination with our group insurance plan, this makes every employee a firm believer in his company.

We have, of course, many other employee activities, designed to improve the power factor of our employees—make their output greater and their hot air radiation less. We hold social and athletic events, we publish a house organ and an employees' manual, which includes all the information given to the groups mentioned above, we stimulate study in N. E. L. A. courses and participation in N. E. L. A. committee work. Perhaps we award a trip to the N. E. L. A. convention to the employee who makes the best showing in the study courses; it gives him fresh enthusiasm and he stimulates his fellows upon his return with a glowing account of his experiences. Each new employee gets a letter of welcome from the president, presenting the manual and stressing our public policy.

Don't forget the women! In this discussion we refer to the employee as "him," but we must remember that there are also many "hers" in our organization. The women should be given the same information and the same opportunities as the men. Except in the public speaking classes, the women should be organized as a separate group. Women will not ask questions which will make them appear ridiculous in masculine eyes; in a group of their own sex they will ask about anything which puzzles them.

The subject of employee information is too large to be covered here in any detail. But our employees have such an important bearing on public relations that we must at least touch the high spots of a crude plan to put them in possession of the information which they should have. Every employee meets at least 100 people in a year. If he is enthusiastic about his company, if he disseminates accurate information, if he makes a good impression and creates a favorable public reaction, does it help us to build sound public relations?

THE CUSTOMERS

Our customers are human beings. Because they are human beings they have all the strength, all the weakness, all the attractiveness, all the repulsiveness, all the magnanimity and all the cupidity which our arboreal ancestors brought with them when they climbed down from the trees.

We must take a broad, tolerant, humane viewpoint in all our dealings with customers. We must remember—

"There is so much good in the worst of us,
And so much bad in the best of us
That not a single one of us
Can criticize the rest of us."

Dress, appearance, speech, education or manners in a customer must have no bearing on the treatment which he receives. The reception accorded the illiterate laborer and the cultured clubwoman must be uniformly courteous. Each has a circle of influence; each is a worthwhile friend.

Our employee training, outlined in the preceding section, makes this possible. Eight different classes of employees, comprising less than 50 per cent of our staff, have the great responsibility of representing our company in the eyes of our customers. They are the telephone operators, contract clerks, cashiers, adjusters (who may also be collectors and inspectors), meter readers, appliance salesmen, linemen, and trouble shooters. These must receive special training from their respective department heads, and their department heads must be thoroughly sold on company policy. Let's take up each class in turn.

Telephone operators must have voices that radiate a spirit of service. If the meaning of this is not clear, pick up your telephone, get central, and listen to her voice. The Bell System has done more to create telephone personality in its operators than any other organization. The company operators should know how to route calls to the proper departments, and not take customers on a telephone journey through our entire organization. If the line is busy, the customer should be told so, and asked if he will wait, not informed "linzbizzy," and cut off quickly. Employees in every department should answer with the name of their department, followed by their own name. Their name is not important? Of course it is! It adds a human touch. And it is not necessary to shout over the telephone; a well modulated voice is easier on the ears.

Contract clerks have a hard job—especially in the larger cities around moving time. Customers usually don't understand the procedure of making out contracts, but that is no reason to make them feel the superior knowledge of the contract clerk. Smiles have their place, but the place for the forced smile of superiority is in last year's files. The contract clerk should feel genuinely anxious to make the signing of the contract as pleasant as possible for the customer; that feeling will be telegraphed to customers by every action. Promises to have lights on at a certain time should not be made unless they can be kept. It is much easier to explain why the lights cannot be turned on a few hours after the contract is signed, than it is to explain a broken promise. Of course service should be turned on as soon as possible, but that is not up to the contract clerk.

Cashiers must be diplomats. They must know how to receive money graciously, and that in itself is an art. Cashiers must be carefully chosen and carefully trained, for their contact with customers is at the point where disputes are most likely to arise. It is hard to make bill paying a pleasure, but a cashier with a pleasing personality can do it. And while we are speaking of bills, we must dilate upon this contact of the accounting department with customers. Bills must be neat, accurate and well laid out or they encourage disputes. Inaccurate bills are intentional in the mind of the recipient; he has caught an attempt to "put something over on him." An erasure makes him suspicious. Requests phrased in the form of orders—"Bring this stub with you"—irritate him. The public relations department should be consulted when the bill form is adopted.

There should be some one person to whom bills will be referred by the cashiers when a dispute involves the computation of a bill—in larger companies this will be a department in itself. The adjuster must understand rates and the operation of a meter; many a bill can be justified in the eyes of a customer through this knowledge. He must be level headed and have his emotions firmly under control at all times. The explosive customer quickly quiets down when he finds the adjuster self possessed.

Closely tied in with this work are meter testing, credit and collections. When there is really justification for a meter test it should be readily promised, but it should not be used as a sedative for an irate customer. A good adjuster can usually tell from circumstances whether a meter is likely to be inaccurate—10 to 1 it will be slow—and if he is convinced that the meter is right, he must sell the bill to the customer. Delinquents are usually covered by the deposit—after a year it can be refunded to those who discount bills—but the last resort is shutting off service. Of course a disgruntled customer is the result, but people who dodge their bills are not likely to be a great influence in any group.

Meter readers are good will builders or a necessary evil, depending entirely upon their training. If they track mud over clean floors, make a racket when they enter a customer's home, indulge in petty thievery or pry into things which do not concern them, they are a disgrace to the uniform which they wear, and their chief should be held responsible. One plan, district representatives, encourages a high type of meter reader by offering greater salary inducement. Briefly, the city is districted and a man assigned to each block of 400 or 500 meters. He reads meters, makes minor appliance repairs, answers questions, collects delinquent bills, sells appliances and in general acts as the *customers'* representative with the *company*.

The appliance department as a whole is a vital point of public contact. It supplies the devices—we prefer to call them electrical household servants—which make possible the satisfactory use of our service. High-pressure methods have no place in the merchandising operations of the electric light and power industry. Doorbell ringing is a nuisance. This does not mean that we must hide behind the counters and wait for the domestic load to be presented to us on a silver tray. We can be aggressive without being offensive. We maintain a testing laboratory in which various appliances are tried and only the best offered for sale. We maintain a home service department which demonstrates appliances after they are purchased by customers—absolutely essential, for example, in the case of an ironer or a range—and conducts public demonstrations to focus attention upon the electrical way of doing things. We maintain a repair department, where appliances may be put in operating condition at small cost. We offer other electrical dealers an opportunity to tie in with our campaigns, thus reaping the benefits of our advertising and sales promotion work.

Trouble shooters, those knights of the day and night, are uniformly our best good will builders. People with lights out are glad to see them anyway, and feel it is their own fault that the lights are out. But we see to it that we get the most out of this favorable point of contact. Our trouble shooters are adequately equipped and arrangements are made so that calls can be handled rapidly. Men are uniformed, for most of their work is done at night and they must be readily recognized. They are courteous and well trained. They make the customer feel that he has not committed a crime; that it is a pleasure to help him out of his difficulty. If they can determine what caused the trouble, they tell the customer, and offer to have the repair department send for it.

Now we come to the linemen. We can't make a Lord Chesterfield out of a lineman, he has his own secret code and vocabulary. We can, however, convince him that he ought to harmonize his efforts with our public policy. He can refrain from commenting so frankly on the perverseness of a lag screw when working in a residential section with women and children around. In industrial sections, where only men are in circulation, he can give freer vent to his feelings—most of us play golf. He can stuff ends of wire in his pocket rather than throw them where the customer's lawn mower will pick them up. He can clean up after each job, and leave the spot as neat as he found it.

So much for our public conduct. Of course continuous, dependable service at reasonable rates must be presumed; we will discuss it further in the section on plant.

How are we going to tell people of our aims and of the work we are doing? We have every right in the world to raise our voices in the market place and tell our story to those who use our service. Further we have a duty to tell the facts of our business, for we alone know them—not through theoretical dreaming but through actual doing.

We enter the advertising columns of the press. There we reach the ear of our customer with our appliance advertising, show him what electricity will do for him and his family, sell him the idea of doing things electrically. An entirely different job is done by our institutional advertising. It sells him our right to exist as a business institution. We show him what we have done to safeguard continuous service, we show him how, by amassing vast sums of capital, employing keen management and encouraging employees we have been able to reduce the cost of electric service while the price of nearly every other necessity of life has mounted. Only too often we are approached for "hold up" advertising—advertising which is really a contribution under duress. Treatment of this problem requires courage. We expect to contribute to causes which deserve support, we cannot contribute to many causes which are really worthy, because of their number, but we refuse to pay graft for the personal profit of individuals. Some requests we grant gladly, others we refuse regretfully and state our reasons for doing so in a straighforward manner to which no reasonable person can take offense, the third class we turn down in terms which permit no misunderstanding—and everyone knows we are justified.

Several other forms of advertising may be used, but they are all based on newspaper advertising. Outdoor advertising—billboards—has its place, and the objection to it is more imaginary than real. Radio opens a new field, and we owe it support because of the off-peak load it has built for us. Bill enclosures or imprints, and other direct mail, offer facilities which we have largely neglected. Our show windows may carry either an institutional or a merchandising message, and so may exhibits at various fairs and expositions.

Distincly different from the advertising columns are the news columns of the press. The electric light and power company is a source of news and can make itself a place on the beat slip of every city editor. One of our officers addresses a meeting, his picture and an abstract of his talk appear; an employee bandages an automobile accident victim, another story; our quarterly statement is released, our budget for the coming year is announced, an employee completes 25 years of service—we could go on indefinitely suggesting sources of news.

There should be some one person in our organization to whom the reporters can come. He should be as free to tell them the cause of an interruption as to tell them the text of the president's speech. He should speak with authority and hold such an office that his statements will bear weight in the news. It should be our policy to submit news on its merits, and forget that we are advertisers in the paper. Newspaper training taught this writer that the advertising manager of a newspaper can get news items run only over the dead body of the city editor.

We have trained a corps of public speakers from our employees. Now we put them to work. Schools, church groups, chambers of commerce, luncheon clubs and social groups are hungry for speakers. We have speakers from many different departments of our company, all well qualified to discuss the work of our company and their own work in particular. We make this fact known, and our story is broadcast.

We may go even further than this. Motion pictures present our story in an attractive and universally understood form. We present a playlet which gets our message across, several such have been written. We cooperate with educational institutions, offering them our facilities and our trained men as instructors—perhaps in this way we discover new blood for our organization.

These are some of the avenues open to us in our progress toward better understanding with our customers. First we make it pleasant to do business with us, and then we become better acquainted by telling people about us in many different and very interesting ways.

Our customers are our public. In their opinions lies the very crux of our public relations problem. Their opinions should be favorable toward us—and will be if we follow some such definite plan as this.

THE PLANT

So far we have dealt with variables—human factors. Now we can discuss a fixed and definite thing—the plant. We can only do our best to make the human factors what we think they should be, but we can make the plant what we want it.

We must assume that our plant is in such shape that it will give the continuous service which customers have the right to expect. We must assume that our rates are reasonable and so constructed as to encourage the greatest possible use of electric service. Whether step or block, our rates should be designed to offer incentive to the freer use of service. When electricity cooks, refrigerates, washes, irons, sweeps, lights and does dozens of other tasks in a man's home, he is disposed to feel more kindly toward the company supplying it. We must also assume that our management is ready and able to expand facilities and aid community growth—demand must not be stunted by meager supply.

Buildings may be useful without being ugly, in fact, many commercial buildings are contributions to modern architecture. Office buildings of electric light and power companies are often the outstanding buildings of their communities. But let's look in the back yard. How are the plants and substations?

It is not always possible to have all our plants objects of beauty, but they can be neat. A little grass, some flowers and attractive shrub planting will work wonders with ordinary structures. If the buildings of our neighbors are shabby, so much the better. Our plant will stand out the more prominently. Substations in residential sections are generally given this treatment, but other property is often neglected. Poles and empty cable reels should be stored neatly and kept out of sight if possible.

We are citizens wherever we serve, and, like all good citizens, we should keep our property neat and attractive as a civic duty.

To interest our employees, we inaugurate a contest among the various stations of our system. We supply the garden tools, seeds and plants up to a certain amount. Following our annual inspection, the prize for the winning station is awarded at a dinner of the employees of that station.

Every building in which we have employees flies the company flag every day and the national emblem on holidays. The company flag is merely a banner or pennant bearing our trademark, and serves to call attention to our property—but property must be in such shape that we can be proud of it. The major stations we mark with electric signs.

We make our stations of public interest by naming them for individuals who have rendered conspicuous service—whether they be officers, directors, or employees. This helps to humanize our company in the public mind—John A. Smith Station replaced the "the steam plant," or "Station C."

We invite inspection of our generating plants by school children and groups of grown-ups. Once a year we have open house week, and use the radio and the newspapers to urge people to come and see us. Of course, if a company has a plant at a point of interest, such as Niagara Falls, open house is held every day of the year. Throughout the year we can make definite appointments with specific groups and take them through the plant without upsetting our routine. Guides need not know the technical story; most people are not interested in that, but they must know the story which we want to get across to our customers. Here, again, our employee public speakers come into play.

Distribution and transmission lines should be as unobtrusive as possible. Poles painted green fade into the foliage of residential sections. Steel towers painted aluminum or gray fade into the sky. Of course, in new sections, we run our distribution lines through the back yards, leaving the streets clear. Our public speakers will stress to school children the folly of climbing poles and towers.

Where excavation is necessary to install or repair underground lines, protection signs explain that it is a sign of community growth. When pavement is replaced, it is replaced smoothly.

Transmission lines which parallel the highway in the open country carry signs stating that they are part of our service facilities, thus impressing people with our vast investment in property.

Tree-trimming is the bugaboo of every electric light and power company. Where it cannot be avoided, it must be done by expert foresters, and some of our linemen have had this special training. Getting permission to trim is a difficult job, which should be handled by someone a little more tactful than a line foreman. The job itself, correctly done, will improve the appearance of the tree and make future trimming easier.

Our trucks should all be painted alike and in distinctive colors. Thus they are easily recognized and people are again impressed with the fact that their electric service company amounts to more than a meter in the celler and a cashier behind a grille. Of course, we require every crew to keep its truck in neat, commendable shape, just as we require station employees to take care of their buildings.

Drivers must not be road hogs. We tell them to keep far to the right with slow traffic, and when it is necessary to pass a car, not to crowd the other driver. We warn them against splashing people with water or mud, and tell them not to be too insistent upon taking the right of way. Good will may be built up by making our truck drivers observe the rules of common road courtesy.

These things we may do very definitely with our plant to make it play the part it should in building sound public relations. We must bring it up to the level to which we have sought to raise the other four factors.

CONCLUSION

Visualize a great symphony orchestra. Each member has his part to play; each is in tune with every other performer. The tympani may have only a few notes, while the first violin has a leading part throughout the composition. The conductor lifts his baton and a wonderful harmony of sound comes from the orchestra. Each in tune, each playing his part as it is scored, each contributing to the splendid performance of the orchestra. When the few notes of the tympani are needed, they are played in tune and in time. It is a *cooperative effort.*

Substitute an electric light and power company—a symphony of public service. Let's call the stockholders the percussion, the employees the strings, the plant the wood wind, the customers the brass, and the management the conductor. Each section must be in tune and each must play its part as it is written in the score. A discordant note, a section which fails to keep time, and our symphony is ruined.

(*Continued on page* 544)

H. M. Byllesby Prize Paper

How to Increase the Usefulness of the Accountant in the Public Utility Industry

By CLARON D. BARBER

IN introducing this subject, it is necessary to concede that the past ten years in the utility industry have been an era, preeminently, of engineering development. In most branches of the utility field, particularly the electrical industry, tremendous advances have been made in efficiency and economy of production and distribution in these ten years.

The credit for these achievements, of which interconnection and the growth of super-power systems, larger turbo-generator units, and powdered fuel combustion, have been a few high spots, is due the engineering and operating management. Such spectacular results in one division of the industry have tended deservedly to draw attention away from what might be called the business departments of the industry, including the accounting. Accounting is not a field in which spectacular results are to be expected, but if rapid development has taken place on the technical side of the business, it is well to inquire if the accounting branch has made proportionate progress. It is not an uncommon view among accountants that public utility accounting has not entirely kept up with the rapid pace at which the industry is moving.

Mr. Barber's paper won the third H. M. Byllesby Prize for 1927-1928 awarded last year at the 51st Convention of the N.E.L.A. Mr. Barber is a native of Illinois and a graduate of the State University. He has been with the Commonwealth Edison Company since graduation and at present is Supervisor of Cost Records in the Purchasing Department of that Company.

ALLOWING for the normal development in accounting which results from growth of larger business units, utility accounting has not shown a great deal of basic change during the last decade. The important exceptions to this tendency are the development and adoption of the Uniform Classification of Accounts in 1922, and the growing use of the Baltimore and other improved systems in customer's accounting. While the Uniform Classification of Accounts was officially the work of the National Association of Railway and Utilities Commissioners, the contributions to this classification by the National Electric Light Association and the American Gas Association were very substantial. Apart from these developments, however, the accountant has been pretty well in the background of the industry's advancement. Critics within and without the industry have voiced the rather bald sentiment that utility accounting is in a rut. Without conceding this, it must be admitted that the accountant is not occupying the place of importance or usefulness that he is today in many industries.

What can be done to increase this usefulness? In an industry as large as the public utility industry, in an industry representing over twelve billion dollars of investment and over two billion dollars of operating revenue, in an industry with the most complex business problems constantly before it, there is a vast amount for the accountant to do—there is need for professional accountants of ability and training. There are many individuals in the public utility field possessing these qualifications, but the number is, in comparison with the magnitude of the industry, proportionately small. If the industry were canvassed for accountants holding CPA degrees, or possessing the preliminary training for such degrees, the results would be surprising. Waiving, however, the immediate present, the industry does not seem to be attracting the junior accounting talent, which its future needs warrant. Few young men of recognized accounting training are entering the industry today, whereas thousands of engineering and technical graduates are entering the public utility industry each year. If the supply of junior accountants from the outside is inadequate, there is still the possibility of developing them, through experience, aided by outside training, within the accounting departments of the industry. There are obvious limitations to this method. Further, the case at present seems to be that the chief interest in accounting education and training is not from employees in the accounting departments. All this does not represent a tendency for the best interests of accounting in the industry. The industry must attract and develop its accounting talent. Paradoxical as it may sound, the first step in increasing the usefulness of the accountant to the industry is to increase the accounting talent the industry has available—with an eye to the future.

APART from this, and taking the accountant as he is in the industry, one step which would materially increase his usefulness would be the separation of the auditing, and the strictly accounting function. The general rule in the industry, though there are notable exceptions, is to place all accounting, excepting customers' accounting, under the auditor. In smaller organizations there is much to be said for this set-up, but in large business units it is not in line with good organization practice. The accounting function involves the orderly and systematic recording of business transactions in analyzed form. Its service is primarily to the operating management. The auditing function is concerned with the investigation and verification of accounting records, including the checking of receipts and disbursements, and the certification of the correctness of accounting charges. Its service is primarily to the corporate management.

These two are essentially different functions approached from essentially different points of view. Where the two are superimposed, one function is necessarily overshadowed by the other. As auditing is, from the managerial point of view, the most important, it submerges the accounting, particularly the plant accounting, function. The accounting system tends to be an auditing system. The plant accounts of most utility organizations, while excellent and correct records of expenditure, are not set up nor detailed, so as to be readily subject to analysis. The insufficiency of public utility accounts is attested by the minor weight given to accounting records in rate cases, which is to be regarded as an unfortunate state of affairs, and by the increasing tendency for utility companies to develop more or less complete property or fixed capital records. These latter are in a sense fixed capital accounts analyzed in their complete detail. The only objection to such records is their cost. In most properties more complete plant accounting methods would give most of the advantages of such records at less cost. Now, plant accounting is a function in itself. It should be handled as such, separate from the auditing. This separation is not a new idea—students of business organization have long favored this plan—and it is a set-up of growing popularity in the general business field. Where it is not held desirable to place plant accounting under a separate officer reporting to the vice-president in charge of accounting, the most recommended set-up, and all accounting is left under the auditor's supervision, the plant accounting should be handled by a distinct organization under a special accountant.

BUT whether or not the industry assumes this revised type of organization, its accounting system, the development of better plant accounting, including, where desirable, fixed capital records, offers a means whereby the usefulness of the accountant may be materially increased. The accountant is possessed with the direct business facts of the industry, he can see and analyze its every business phase. He is on the firing line of practical economics, and he is in one of the best positions to prove the efficiency, the integrity, the farsightedness, and the broad consideration for public interest which has characterized modern utility management. Clear, complete, readily understandable and verifiable accounting records and presentations of fact, should be of the greatest value to the industry in meeting investigation or criticism.

Another means of increasing the usefulness of the accountant is through the increased use of cost accounting in the industry. At present, utility cost accounting, with the exception of production cost, is in the initial stage of development. Production costs in both the electric and gas utilities are already on a scientific basis, though the possibilities are by no means exhausted. Distribution costs, and the costs of serving different classes of consumers and different service areas, are still in a rather nebulous state. The application of scientific costing principles to such problems might produce highly interesting results.

A branch of cost study in which much more could be done is the study of investment and material costs. The utility industry is unusual, in that it must regularly increase its investment. Cost analyses of the various items and classes of the materials and labor going into this increased plant would form the basis for better cost control. In purchasing, planning, and construction, there is a real field for cost analysis.

At the present time a good deal of cost work is carried on by various departments other than the accounting. Much of this has been necessary because the information was not available in the accounting department. The accounting departments are passing up an opportunity to be of assistance to the other departments; that is, to the industry as a whole.

A GOOD deal has been said in recent years about simplified accounting practice. The term has, however, been used so loosely and has been so often used as a mere catchword, that it is better used with extreme caution. True, simplified accounting methods are always desirable. They should be the constant aim of the accountant. No doubt there are corners that can be cut in the utility industry. The mechanism of utility accounting for the industry as a whole, however, probably is on a reasonably direct and simple basis.

A field in which there is more to be done is that of standardized accounting practice. Even in individual companies there are necessarily some inconsistencies of practice. For the industry as a whole, however, there is a good deal of variation in the methods of handling certain accounting problems. Chief among these is the handling of depreciation. The diversity of practice in the industry in regard to this item is surprising. Though there has been a great deal of discussion, there has not been the necessary investigation or constructive thought on this subject. At present the apparent inconsistency in meeting depreciation from company to company offers an opportunity for the adverse critic. The same holds true to a lesser extent of many controversial points of accounting. Any standardization should not, however, infringe on the discretionary field of management.

Labor is becoming a more and more expensive item in the industry. In this connection the accountant can be of service to the industry through the application of machine methods to accounting. Much has been done in this line, and, as in the engineering side of the business, it is necessary to put pressure on the manufacturer. It was long after the demand had been voiced for an electric billing machine adapted to customers' billing that a satisfactory one was actually available. But better machines will come, and much of the apparently lifeless routine of accounting can, if given time, be adapted for machine operation by the accountant. It is up to the latter to perfect the systems and methods that will make the next era the machine age in accounting.

In customers' accounting particularly the need for the most accurate methods and systems is a challenge to the accountant. No branch can do more to damage customer relations than the accounting and billing department. Whether through machine methods or improved systems and routines, or other means, the accountant can here perform a real service to the industry in making customers' accounting more exact, more error-proof, and more courteous.

TWO innovations which have entered industry in recent years and which offer certain advantages to the utility business are the thirteen-month year and the "Natural Business Year." The thirteen-month year is a method whereby records and accounts are kept on a basis of thirteen periods of four weeks each instead of on the traditional monthly basis. It offers the great advantage of making accounting data and costs directly comparable from period to period. It puts costing on a really scientific basis. At present it is quite impossible to compare results for a month such as February, which has twenty-three working day, with, say, March, which usually has twenty-seven. Many business firms keep their entire system of accounts and records on this basis.

The "Natural Business Year" is a plan whereby any industry takes as its fiscal year a period which reflects a complete cycle of the industry's activity and which ends during the season of least activity. In the utility industry this would mean a year which would close some time, as would be found best, during the off-peak spring or summer months. Such an accounting period would eliminate much of the strain and extra work which the present December 31 closing entails. It would move the closing period from the holidays and from the winter season of high activity and inventories. It would greatly facilitate taking the annual inventory, and would mean a large saving in costs. It would further reduce the expense and increase the efficiency of the outside audit. Consulting auditing firms are called upon by practically all the industries to make their annual audits on the basis of a year closing December 31. This work must be crowded into two or three months at most, and additional help which is often of less than professional standard must be taken on to meet these demands. At other times their staff of accountants is only partially occupied, and audits could be performed to much greater advantage. Both of these plans would require considerable adaptation of existing business methods in the industry. Both, however, represent a definite attempt to put accounting on a more scientific and useful basis and offer in themselves material advantages to the accountant.

EDUCATION programs are coming to be more and more used in business. In such a complex industry as the public utility industry education has a particular value. If the industry needs trained and more useful accountants, methods of education and training may be used very effectively to this end. Outside training in accounting courses of recognized schools of business, special courses developed in the industry, and extension courses, offers the accountant the general training he requires beyond the job training and the experience he should receive in the course of his work. But the accountants' training should go further—it should familiarize him with engineering and technical problems and with the general principles of the utility industry. It is even desirable that he receive working experience in the other important departments of his company. The accountant, if he is to be of the most value to his organization, must have a broad training as well as a specialized one.

Closely connected with education is that of interchange of ideas and experience within the industry. It is noticeable that accountants are less prone to meet on their common ground than are the technical men. For every article on accounting in the trade press there is a veritable myriad of treatises on engineering subjects. There is too little scientific accounting thought expressed today. This is an undesirable tendency. The accountant should be urged and should undertake on his own initiative to keep in better contact with his associates in the field.

The accountant's work is at present not overly well understood by the other branches of the industry, and hardly at all by the general public. The accountant is himself to blame. He has hidden too long in a veil of mystery engendered by such terms as Debit and Credit, Deferred and Accrued Charges, Net Worth, Net Quick Assets, and the like. At present the old statement that it takes an accountant to understand an accounting report is still too often true. Collectively, the accountants are probably the poorest salesmen in the industry, for they have failed to sell the idea of accounting. The accountant must come out from behind this screen—he must explain the aims and means of accounting and insure the recognition of the rest of the industry. He must explain and simplify his accounting reports so that they will be more readily understandable. A few companies, in their yearbooks, explain in simple terms the items under each heading of the operating statement and the balance sheet. This is a very desirable step, for it gives the stockholders and the public something they can understand. It is human nature that people are suspicious of that which they do not understand. With a larger portion of the public constantly becoming our stockholders, this is important. Another desirable step would be to split the fixed capital account into its main constituents. At present it appears on the published balance sheet as a large and uncompromising figure which does not possess a great deal of meaning. If the facts the accountant presents are to be grasped, he must present them in the simplest, most concise, yet complete manner.

IN conclusion, it may be reiterated there is much that can be done to increase the usefulness of accounting, and proportionately of the accountant in the industry. Since the war there have been radical developments in business methods, and the pace continues to be rapid. In the utility industry, with the tremendous growth that comes as a necessary thing from year to year, with the development of larger and larger systems, with the growth of holding company and intercorporate relationships, the accountant must be prepared to meet more and more complex problems. He must shift and adapt his systems and methods to meet the varying demands of business for information, for control, for analysis. He must, above all, be openminded. In these things and the extent to which he is able to make the contributions that have been indicated as possible, the future usefulness of the account to the industry will be measured.

Recent N. E. L. A. publications are listed on inside cover pages.

SURGES AND FLASH OVERS

By FRED W. HERBERT
Director, Service Department, NELA

What's the use of a lovely face if it mirrors ugly traits?

* * *

Have you ever noticed how easy it is to buy something you want and how hard it is to sell something you don't want?

* * *

Would you call alimony a court plaster?

* * *

Definition of a Reading Lamp—An article of furniture placed anywhere in the room except near an easy chair.

* * *

Scientists have discovered a new insect. It has been named the golf moth.

It does eighteen holes in one day.

* * *

A paradox: Youth is the oldest thing in the world.

* * *

The cigar stores have discontinued coupons. The new currency is about the same size as former coupons, so watch your step.

* * *

The sense of humor is growing every day, if you realize the way some girls can take a joke (in a husband).

* * *

What a blessing it would be if we had the power of the President to veto our own bills as he does some that Congress presents to him.

* * *

Consistency, thy name is woman. The stockingless fad is on, coupled with the fur neck piece on hot days.

* * *

"All the world's a stage." Yes—ninety-five per cent stage hand, chorus, and supes, and five per cent stars.

* * *

In years back travel abroad was for thirst of knowledge. Now it seems it is just for thirst.

* * *

The electric inventors are asleep on the job. In these days of delicatessen meals and canned supremacy in food stuffs, why hasn't somebody invented an electric can opener?

* * *

The good book says that "all men are made of dust." Not so with some, as dust always settles.

* * *

The age is progressing. Most people are doing everything on time now—installment payments.

* * *

Habit is a cable; we weave a thread of it every day, and at last we cannot break it.—Horace Mann.

* * *

Some people have a genius for doing nothing and do it perfectly.

* * *

Flies dislike the air current of an electric fan and leave for a quieter zone.

Behind the Veil

Science, Democracy and Frogs' Legs

By ERNEST GREENWOOD

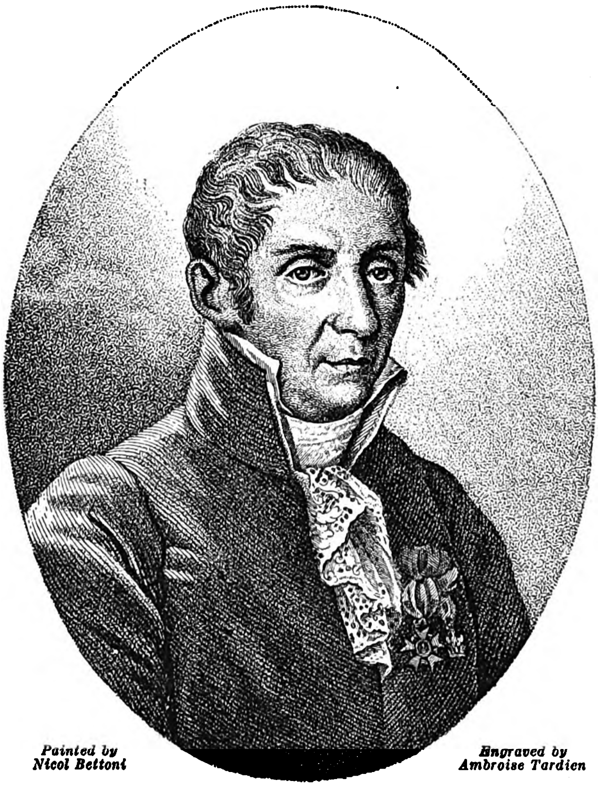
The fifth of a series of articles portraying, against a social-historic background, the evolution of the electrical industry and the chief personalities that have been instrumental in its growth.

ONCE more I am faced with the necessity of abandoning an orderly chronology if this series is to be actually what it pretends to be—a portrayal of the evolution of the electrical industry against a social-historic background. Last month I called attention to the statements by Henry Adams concerning the eighteenth century; the appearance of a new variety of mind; and the fact that the whole number of those who, like Franklin, acted as electric conductors of the new forces from nature to men, down to the year 1880 did not exceed a few score, and they were confined to a few towns in Western Europe. America, except for Franklin, "stood outside," and I agreed with Phillips Russell in his designation of the good Benjamin as the "first civilized American." Now I find I must present some sort of a perspective of the eighteenth, the nineteenth and the beginning of the twentieth centuries before proceeding with the discussion of the chief personalities instrumental in the birth and growth of this great public service industry which has brought about such astounding changes in the lives and habits of thought of men. Once more I shall draw heavily on Geoffry Parson's "Stream of History."

WHILE historical analogies are as dangerous as they are tempting, it is interesting to compare the eighteenth century with the twelfth and fifteenth centuries and the nineteenth with the thirteenth and sixteenth. In the first instance, we find similar creative outbursts, and in the second we find the nineteenth century developing ideas and movements originating in the preceding century, just as the thirteenth and sixteenth centuries developed ideas and movements originating in the preceding centuries.

The years 1700 to 1800 provide one of the most interesting periods in history, beginning, as they did, with an atmosphere of classicism and aristocratic charm and ending with the bloody French Revolution which broke every conventional rule of government. This century saw the rise of two new world powers, Russia and Prussia, and the destruction of Poland by partition. Science and invention, under the guiding hand of our "few score scientists," marched quietly forward laying the foundation for a new society and a new manner of life. The industrial revolution in England, beginning before the French political revolution and continuing long afterward, laid down the physical conditions under which the nineteenth century developed.

During the years 1800 to 1900, the application of what had gone before proceeded with such speed that material achievements outran man's ability to organize the society they produced. From the French revolution onward, the welfare of the average citizen became increasingly the center of interest. First civil rights, then political rights and finally education, wages and health became successively the object of governmental concern.



Painted by Nicol Bettoni

Engraved by Ambroise Tardien

ALESSANDRO VOLTA

THESE two centuries had science and democracy as their basic forces. Of these, science was, perhaps, the more fundamental. The world became smaller and smaller as means of communication and transportation increased. "With the arrival of America, Japan and China on the world scene, the final stage of world history, the Pacific, succeeded to the Atlantic which had, in turn, succeeded to the Mediterranean."

We are told that pure science inspired the intellectual growth of this age and that applied science erected its physical background. Parsons says that "invention can be regarded as no more than applied science, yet it made its early advances independently of science. Printing from moveable type, one of the most important of all inventions, was developed without the aid of science in the modern sense. The mind of the early inventor was mechanical and imaginative, concerned not in general truths but in devices producing specific results. Since then invention has become increasingly related to science, as the acceleration in the process of invention records. The inventions or discoveries during all the centuries prior to 1700 are far less numerous than those of the eighteenth and nineteenth centuries; and the last decade shows a swiftly increasing list of wonders."

Digressing for a moment we note that the Grand Old Man of the light and power industry—the great pioneer who laid the cornerstone of its structure as we know it today—Thomas A. Edison, developed his multitude of inventions much after the manner of these early inventors. He has always been principally concerned in "devices producing specific results" and his methods have always been those designated as trial and error. He had to imagine and he had to create. He had to have patience, vision, industry and persistence. And after he had imagined his lamp, as Berton Braley tells us, "the light of the world was to hang by a thread. Indeed, by the ashes of a thread. Wherefore all the world must be ransacked for a fibre that would glow and continue to glow after it had been burned. The quest for the Golden Fleece was a mere jaunt by comparison to the search for a single filament. Finding a needle in a haystack was as easy as finding Cleopatra's Needle in Central Park when put beside this job of discovering the fibre for the incandescent lamp." But this is a story reserved for a later chapter.

HISTORIANS tell us that after the founding of modern chemistry by the Frenchmen, Lavoisier (1743-1794), the next great step was taken by John Dalton (1766-1844), an Englishman, who conceived "the first scientific hypothesis of the atom as a sub-division of the molecule." But the conception of matter as made up of small separate particles called atoms rather than uniform and continuous, was speculated upon by Democritus, one of the great Greek philosophers, in the fifth century B. C. It was restated by Lucretius. Now our scientists tell us that the atom is not the hard, indestructible thing which Dalton supposed it to be, but itself undergoes transformation.

The eighteenth century saw the invention of the spinning-jenny, the spinning machine, the steam engine, the power loom and the cotton gin. In every case the successful inventor was preceded by earlier men who failed by a narrow margin, and in many cases it is difficult to award final credit to any one name. This is just as true today as it was then. Only recently Mr. Edison's claim to the first practical incandescent lamp has been challenged, although the careful student of history must be convinced that, while the principle of this lamp was not new, Edison not only devised the first practical commercial lamp but he also invented the methods for the generation and distribution of the electrical energy by means of which it could be placed in general use.

In the nineteenth century came the invention of the steam-boat, the steam locomotive introducing the steam railway, the telegraph, the Bessemer steel process, electric light, the telephone, X-Rays and the automobile, while in the early days of the twentieth century came the aeroplane, wireless and radio broadcasting. These inventions fall into three general classes: they increase production in industry by substituting machine power for man power; they accelerate transportation and communication; or they increase health, convenience, comfort and luxury. Some, like the telephone and electric light and power, belong in all three categories. All contribute to the industrial revolution which began in England and which is still spreading around the world.

The industrial revolution which had its beginning at the close of the eighteenth century, had a dark beginning. Villages decayed, cities sprang up and unemployment was chronic. In addition, the English *laissez-faire,* or "let us alone," theory of government and economics permitted a terrible abuse of the factory workers. Men worked from 12 to 14½ hours a day as late as 1825, while children, some of them under five, worked in cotton mills from 5 a.m. to 8 p.m. The British Factory Act of 1833 cut the hours of children under 18 to 12 hours a day. A long line of protective legislation followed until the increased wealth produced by machinery is being increasingly shared with labor. Much of the credit for bringing this about must go to trade unionism.

The story of Great Britain's industrial revolution was repeated later in France, in Germany, in the United States and throughout Europe. Under the genius of Bismarck, the *laissez-faire* policies of England were rejected by Germany and governmental regulation provided the most enlightened aid—for worker and capitalist alike. France has remained a self-subsisting unit balanced between agriculture and industry, with the peasant still a powerful factor. America has reached the stage where agriculture is being passed by manufacture. Industry, itself, has now begun to enter the most advanced nations of the East.

THE arrival of democracy, in a political sense, was "marked by a series of explosions." The American Revolution was primarily a political one to throw off British sovereignty, and the government set up was a republic carefully safeguarded against radical change by a written constitution and a system of checks and balances among the executive, legislative and judicial branches. The whole was modelled after the British and colonial governments with a President substituted for a king but omitting a prime minister.

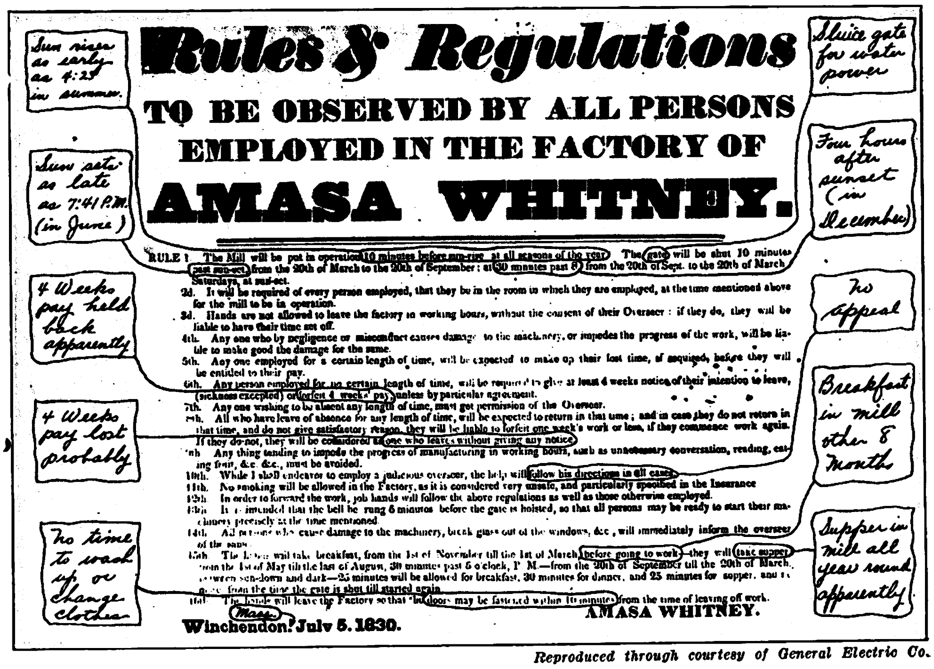
The French Revolution has only been surpassed in bloodshed and terror by the Revolution in Russia. During the succeeding 80 years France was torn between dictatorship or monarchy and radical democracy until the arrival of the third republic in 1870 brought about some semblance of equilibrium. In England, where representative government made slow but steady progress, democracy arrived in the wake of the industrial revolution with a minimum of violence. It has been said that England is the most democratic nation in the world, but this applies only to politics. "Thanks to her responsible cabinet system," says Parsons, "her government is more immediately responsive to popular will than is the American." Both America and France have outstripped England in social democracy. In this country the pioneer spirit which formed American character has kept the United States a land of friendliness and opportunity.

WHILE history records many important experiments in electricity and magnetism between the year 1752, when Franklin announced his kite experiment, and the year 1800, the most outstanding figure of this period from the standpoint of a history of the electrical industry is Alessandro Volta, an Italian natural philosopher and professor at the University of Pavia, and for whom the unit of electrical measurement, the volt, was named. In 1775, he announced his invention of the electrophorus, a sort of perpetual reservoir of electricity, but his crowning effort lies in the discovery of the development of electricity in metallic bodies and the production of the famous "Voltaic Pile." While the last mentioned discovery was made in 1796, it was not announced until the 20th of March, 1800, and then only in a letter to Sir Joseph Banks who communicated it to the Royal Society.

The voltaic pile consisted of an equal number of zinc and copper discs separated by circular plates of cloth, paper or pasteboard soaked in salt water or dilute acid, all being properly connected to develop a large quantity of the "electric fluid." Thus, says Dr. Dickerson in his address at Princeton College, "Volta gave to the world that new manifestation of electricity called Galvanism. In that form this subtle agent is far more manageable than in the form of static electricity; and by the use of galvanic batteries a current of low tension, but of enormously greater power, can be maintained with little difficulty; whereas static electricity is like lightning, and readily leaps and escapes on the surfaces on which it is confined."

"It was Volta who removed our doubtful knowledge," says Faraday in his "Researches." "Such knowledge is the early morning light of every advancing science, and is essential to its development; but the man who is engaged in dispelling that which is deceptive in it, and revealing more clearly that which is true, is as useful in his place and as necessary to the general progress of science as he who first broke through the intellectual darkness and opened a path into knowledge before unknown."

About the time that Volta announced his Voltaic Pile he constructed an electric battery, which was named La Couronne de Tasses (the crown of



Sun rises as early as 4:25 in summer.

Sun sets as late as 7:41 P.M. (in June)

Rules & Regulations

TO BE OBSERVED BY ALL PERSONS EMPLOYED IN THE FACTORY OF

AMASA WHITNEY.

Sluice gate for water power

Four hours after sunset (in December)

RULE 1. The Mill will be put in operation 10 minutes before sun-rise at all seasons of the year. The gate will be shut 10 minutes past sun-set, from the 20th of March to the 20th of September; at 30 minutes past 8 from the 20th of Sept. to the 20th of March. Saturdays, at sun-set.

2d. It will be required of every person employed, that they be in the room in which they are employed, at the time mentioned above for the mill to be in operation.

3d. Hands are not allowed to leave the factory in working hours, without the consent of their Overseer: if they do, they will be liable to have their time set off.

4th. Any one who by negligence or misconduct causes damage to the machinery, or impedes the progress of the work, will be liable to make good the damage for the same.

5th. Any one employed for a certain length of time, will be expected to make up their lost time, if required, before they will be entitled to their pay.

6th. Any person employed for no certain length of time, will be required to give at least 4 weeks notice of their intention to leave, (sickness excepted) or forfeit 4 weeks' pay, unless by particular agreement.

7th. Any one wishing to be absent any length of time, must get permission of the Overseer.

8th. All who have leave of absence for any length of time, will be expected to return in that time; and in case they do not return in that time, and do not give satisfactory reason, they will be liable to forfeit one week's work or less, if they commence work again. If they do not, they will be considered as one who leaves without giving any notice.

9th. Any thing tending to impede the progress of manufacturing in working hours, such as unnecessary conversation, reading, eating fruit, &c. &c., must be avoided.

10th. While I shall endeavor to employ a judicious overseer, the help will follow his directions in all cases.

11th. No smoking will be allowed in the Factory, as it is considered very unsafe, and particularly specified in the Insurance

12th. In order to forward the work, job hands will follow the above regulations as well as those otherwise employed.

13th. It is intended that the bell be rung 5 minutes before the gate is hoisted, so that all persons may be ready to start their machinery precisely at the time mentioned.

14th. All persons who cause damage to the machinery, break glass out of the windows, &c., will immediately inform the overseer of the same.

15th. The hands will take breakfast, from the 1st of November till the 1st of March before going to work—they will take supper from the 1st of May till the last of August, 30 minutes past 5 o'clock, P. M.—from the 20th of September till the 20th of March, between sun-down and dark—25 minutes will be allowed for breakfast, 30 minutes for dinner, and 25 minutes for supper, and no more from the time the gate is shut till started again.

16th. The hands will leave the Factory so that the doors may be fastened within 10 minutes from the time of leaving off work.

Winchendon, Mass. July 5, 1830.

AMASA WHITNEY.

4 Weeks pay held back apparently

4 Weeks pay lost probably

No time to wash up or change clothes

No appeal

Breakfast in mill other 8 Month

Supper in mill all year round apparently

Reproduced through courtesy of General Electric Co.

A factory bulletin of 1830

Men worked from 12 to 14½ hours a day, while children, some of them under five, worked in cotton mills from 5 a. m. until 8 p. m.

cups), and which consisted of a number of cups arranged in a circle, each cup containing a saline liquid and supporting against its edges strips of zinc and silver. At the upper part each zinc strip was connected by a wire to a strip of silver on an adjoining cup, the silver strip of the first cup and the zinc strip of the last cup forming the poles of the battery. It is said that 20 such combinations decomposed water, and that 30 gave a distinct shock.

VOLTA obtained permission from the Italian Government to go to Paris and lecture before the French National Institute. Napoleon, who had seized the reins of government and turned the "rule of the people" into a dictatorship, was a member of the Institute and attended Volta's second lecture, witnessing the decomposition of water. He proposed that a gold medal be struck to commemorate the discovery and that a commission be appointed to repeat all of the experiments on a large scale. Biot, the chairman of the commission, reported on Dec. 11, 1800, and in addition to the gold medal Volta received from Bonaparte the sum of six thousand francs in gold and the Cross of the Legion of Honour. This was the same Bonaparte who laughed at the idea of lighting with gas, calling it "a grand folly."

To Volta has been attributed the fact of having, as early as 1777, entertained the idea of an electric telegraph, although but little appears to be on record in relation to the matter. Fahie quotes a letter of Sir Francis Ronalds, alluding to an autographed manuscript, dated Como, April 15, 1777, and gives its translation by Cesar Cantu, wherein Volta states that he does not doubt the possibility of exploding his electrical pistol at Milan, through wires supported by posts, whenever he discharges a powerful Leyden jar at Como. If this is true then Volta was thinking about the principle of the telegraph long before Morse was born.

It was the experiments of Galvani (Aloysio or Luigi), an Italian physician, which led Volta to the discovery of the Voltaic Pile and of voltaic or galvanic electricity. The manuscript giving the results of these experiments upon the Electricity of Metals is dated Sept. 20, 1786. From papers in the "Bolognese Transactions" it would appear, however, that even before the year 1780 Galvani had made observations upon the muscular contraction of frogs by electrical agency.

It seems that one day his wife happened to be holding a scalpel against the dissected legs and parts of the spine of a frog, which lay in close proximity to the conductor of an electrical machine recently charged by one of his pupils. She noticed that whenever the dissecting knife touched the muscles they were violently convulsed, and, upon communicating the fact to her husband, he repeated and extended the experiment and found it necessary to pass the electric fluid through a metallic substance in order to develop the result originally observed. At first the frogs had been hung upon a copper hook that had been fastened to an iron railing, but he afterward substituted an arc composed of both metals, and with which he could readily produce the same results as were obtainable with an electric machine.

Galvani also made experiments to ascertain the effect of atmospheric electricity upon the nerves of frogs. He connected the latter to rods leading to lightning conductors erected upon the roof of his house, attaching ground wires to the legs, and found that the same convulsions appeared whenever lightning was seen and likewise when heavy storm clouds passed over the house.

THE results of his many interesting observations were first made public during 1791-92. He expressed the belief that the bodies of animals possess a peculiar kind of electricity by which motion is communicated through both nerve and muscle, positive electricity going to the nerve, while negative electricity goes to the muscle, and that the muscles represent the exterior and the nerves the interior of the Leyden jar, the discharge being similarly produced by the metal which communicates with both.

There are a number of other incidents which happened during this period and which are worthy of note before we pass on to the work of Sir Humphry Davy and his experiments with the electric arc. In 1753, Charles Morrison wrote to the *Scots' Magazine* a letter entitled "An Expeditious Method of Conveying Intelligence," wherein he suggested a practical manner of transmitting messages by frictional electricity. Commenting on this letter, Sir David Brewster said, in 1859: "Here we have an electrical telegraph upward of a hundred years old, which at the present day would convey intelligence expeditiously, and we are constrained to admit that C. M. was the inventor of the electric telegraph. . . . Everything done since is only improvement." Yet only a few paragraphs back I indicated that Volta, in 1777, first suggested it.

Looking about a little further, I find that in 1773 Dr. Louis Odier, a well known Swiss physician, wrote to a young lady as follows: "I shall amuse you, perhaps, in telling you that I have in my head certain experiments, by which to enter into conversation with the Emperor of Mogol, or of China, the English, the French, or any other people of Europe, in a way that, without inconveniencing yourself, you may intercommunicate all that you wish, at a distance of four or five thousand leagues in less than half an hour! Will that suffice you for glory? There is nothing more real. Whatever be the course of those experiments, they must necessarily lead to some grand discovery; but I have not the courage to undertake them this winter. What gave me the idea was a word which I heard spoken casually the

(Continued on page 544)

Resolution to Mr. Edison

DURING the Fifty-Second Convention of the National Electric Light Association held at Atlantic City, Thursday, June 6, was celebrated as Edison Day. The program for the morning session included addresses by Messrs. P. S. Arkwright, president of the association, Charles L. Edgar, John W. Lieb, Elmer A. Sperry, Thomas N. McCarter, E. W. Rice, Jr., and Berton Braley, all in honor of Mr. Edison.

Mr. Lieb, in the course of his address proposed that a resolution of felicitation and congratulation be forwarded to Mr. Edison at his winter home in Florida. Accordingly the following resolution was sent by telegraph to Fort Meyers on the same date:

RESOLUTION

Whereas, this year marks the fiftieth anniversary of the invention of the practical incandescent lamp by THOMAS ALVA EDISON; and

Whereas, the electric incandescent lamp is the foundation on which the magnificent superstructure of the Electric Light and Power Industry has been reared to undreamed of heights.

Now, therefore, be it RESOLVED by the National Electric Light Association which is in session at its Annual Convention in Atlantic City, N. J., by setting aside Thursday, June 6, as EDISON DAY in celebration of the Golden Jubilee of the incandescent lamp, the Association acknowledges the everlasting debt of gratitude which it owes to the genius and indefatigable industry of Mr. Edison, whose inventive mind envisaged not only the development of the incandescent lamp, but also a complete system of electric generation and distribution necessary to bring the benefits of these, and other epoch-making inventions of Mr. Edison to mankind, so that they have become part of the heritage of the Electric Light and Power Industry;

And, be it further RESOLVED that the National Electric Light Association express to Mr. EDISON its hearty congratulations and felicitations on this memorable occasion, rejoicing that it can pay him this homage and do him honor while he is still in our midst, with his gracious helpmate ever at his side, and while he is still actively living his full life, so replete with accomplishments, enriched with rewards and enjoying the love and esteem of mankind, all of which constitutes a marvelous contribution to the happiness, convenience and comfort of civilization, in which we are privileged to share. And in this Golden Jubilee celebration we join all the world in heralding the genius and great accomplishments of THOMAS ALVA EDISON.

P. S. ARKWRIGHT, *President*
JOHN W. LIEB, *Honorary Chairman of Meeting*
C. L. EDGAR, *Chairman*

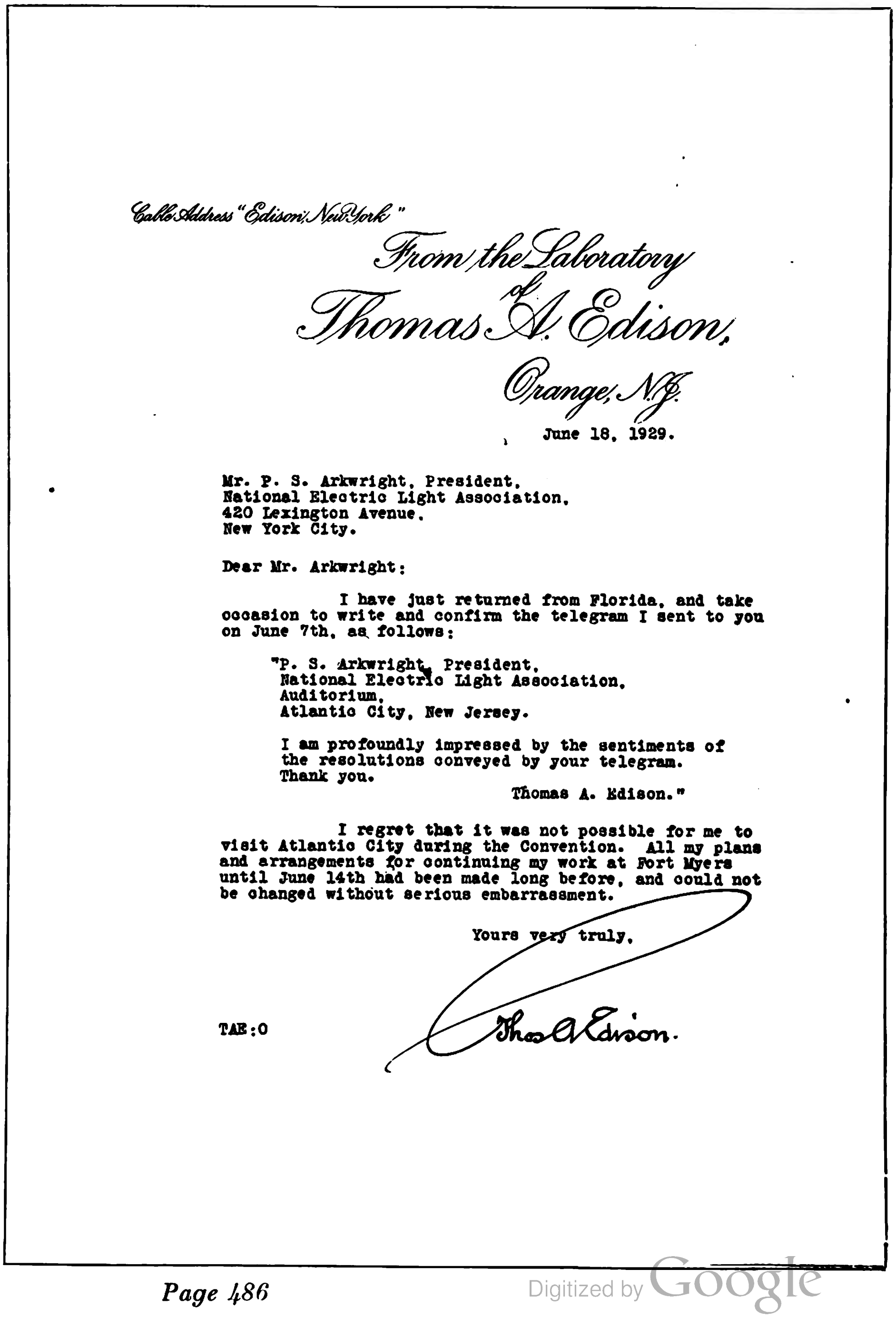
June 6, 1929

Mr. Edison in return wired his appreciation of the resolution, and upon his return to New Jersey addressed a letter of confirmation to Mr. Arkwright, which is reproduced on this page.

The addresses mentioned in the first paragraph have been reproduced by this association in a very handsome book of forty pages whose dedication reads: "On June 6, 1929, a great industry assembled in Convention in Atlantic City, paused to do honor to a distinguished American citizen—Thomas Alva Edison.

"To him who laid the cornerstone of the structure which it represents, this book, containing the words of appreciation spoken on that day, is dedicated by the National Electric Light Association in grateful acknowledgment of its obligation to him and his accomplishments."

A copy of the book has been sent to each member company of the association.



Cable Address "Edison, New York"

From the Laboratory of Thomas A. Edison, Orange, N.J.

June 18, 1929.

Mr. P. S. Arkwright, President,
National Electric Light Association,
420 Lexington Avenue,
New York City.

Dear Mr. Arkwright:

I have just returned from Florida, and take occasion to write and confirm the telegram I sent to you on June 7th, as follows:

"P. S. Arkwright, President,
National Electric Light Association,
Auditorium,
Atlantic City, New Jersey.

I am profoundly impressed by the sentiments of the resolutions conveyed by your telegram. Thank you.

Thomas A. Edison."

I regret that it was not possible for me to visit Atlantic City during the Convention. All my plans and arrangements for continuing my work at Fort Myers until June 14th had been made long before, and could not be changed without serious embarrassment.

Yours very truly,

Thos A Edison.

TAE:O

Contemplating Rural Electrification

By AMPLIFIER

NOT SO VERY long ago a writer on various subjects connected with industry and national economics dealt at some length with what he called the "obligations of the electric power industry." He expressed the opinion that the industry and its employees must be considered in the light of social values. He believes that under existing rate regulatory laws a stable income is guaranteed to the light and power companies and because of this alleged fact interprets the obligation which he sets up as meaning the electrification of rural and other areas that give little promise of high returns; and a variety of other things with which, for the moment, I am not concerned.

ALL of which goes to show how far afield an economist can go when he is concerned only with his own theories and starts dealing with a national institution with which he apparently has no direct contact. Had he written this line (I almost said "wisecrack") 15 years ago, there might have been some semblance of a practical suggestion in it. To write it today, considering what the light and power industry has done in the way of rural electrification—much of it not only not giving promise of high returns but not giving promise of even a decent capital wage—marks the writer as one who knows little, if anything about his subject.

I have before me a booklet entitled "Sixth Annual Report to the Committee on the Relation of Electricity to Agriculture" by Dr. E. A. White, Director of the Committee, and published from its headquarters in Chicago. It is not easy reading and I do not blame the average economist or newspaper writer for not digging into it. On the other hand it is a rather remarkable document and anyone who believes that rural electrification is one of the obligations of the electrical industry, and wishes to advertise that belief, can hardly afford to overlook it if he or she is intellectually honest. Though the report itself may not have been available until recently, the facts which it contains have been available for some time and are worthy of at least a footnote; even in an article or book which sets out to prove that the so-called "power trust" is deliberately avoiding its obligations to society.

What are these facts? Do they show that the light and power industry has no interest in the extension of its lines in any direction except those which will guarantee a definite and satisfactory return on the capital invested or do they show that it is going far and beyond any reasonable effort to serve those whose daily lives are outside urban territory? In other words, has the industry been trying to serve the farmer or has it been sitting back, waiting until its hand might be forced, so to speak, by some governmental order? Let us see.

Not so very long ago it was my good fortune to have a long talk with "Doc" White, who made this report to the committee. He was pleased to say that he thought I was agriculturally-minded, which I accepted as a compliment inasmuch as on a farm I would probably make a good subject for a comic strip. This, however, is not important. What is important is the question as to whether or not the average farmer is electrically-minded and if so, in what direction—the actually physical operation of his farm, or the living conditions in his home, or both.

DOCTOR WHITE believes he is electrically minded, but a perusal of the report leads me to believe that the light and power industry has had to expend considerable effort to make him so. I find, for example, that very largely due to the efforts of the Rural Electric Service Committee of the National Electric Light Association, a Rural Electric Short Course is being given by a number of Agricultural Colleges. The most curious thing about these courses is that they are not directed at the farmer, as one would naturally expect, but at representatives of the light and power industry. In other words, the industry set about to have its own men well grounded on the application of electricity to farm operations so that they, in turn, might discuss the subject with farmers intelligently.

This means—and now I will quote from the report—that "the Rural Service men employed by the light and power companies constitute a most potent group in developing appreciation of the possibilities of electric service in agriculture when considered from the standpoint of the farmer, the company rendering the service, or the manufacturer of equipment. These men, through the distribution of literature, public addresses, prepared articles, equipment demonstrations, and personal contact with individuals, constantly keep new developments before the farmers of their territory." In 1928 there were no less than 385 of these men devoting their time to rural electrification work, and this number is being increased rapidly.

BUT educational effort has not stopped with short courses for light and power representatives. According to the report, an Agricultural Extension Service, working through county and home demonstration agents, will be found in many states. The part which this service may play in the rural electrification movement has been admirably expressed by Professor K. L. Hatch of the University of Wisconsin, who, in the course of an address, said in part:

"Our extension service believes that it is as much a part of its job to educate farmers in the value and use of the electric current as it is to show them the value of better dairy cows or to demonstrate the proper use of lime and fertilizers. Personally, I believe it is of far greater importance. As has already been pointed out, the adoption of better farm practices may easily accrue to the benefit of somebody else, while the adoption and use of the electric current on the farm must result first in improved living conditions on that farm. It may too, at the farmer's own choice, shorten his hours of work and give greater opportunity for leisure and enjoyment to himself and his family."

And so, as nearly as I can make it out, the first step in this so-called rural electrification campaign was to find a way to educate men in its problems, who in turn could educate the farmer to the economic and social benefits of electricity on the farm. This had to be done in the face of what must have seemed, a few years ago, almost insurmountable financial problems. It is all very well to say "electrify the farms," and it is a comparatively easy matter if it can be done as they do it in Ontario—at the expense of the tax-payers, whether they live on farms or in cities—but, when the light and power company sees only a market which will hardly pay the interest on the cost of the copper wire used in reaching the farm without any benevolent government subsidies, it takes not only faith and hope but a very distinct sense of obligation to society to give such projects consideration.

Yet, if one is to believe this somewhat ponderous and exceedingly documented report, the light and power industry has, for years, believed in rural electrification and has been willing to spend money and time and effort to find a practical way to bring it about. It seems to have first thought about it from the standpoint of the farmer. Second, it seems to have thought about it from the standpoint of its own investors and urban consumers. Third, it seems to have thought about it from the standpoint of society in general—national economy, if you please, or national welfare, or anything else you may choose to call the urge to make some sort of a contribution to things as they are in order that they may be a little bit better.

On January 1, 1924, only 175,000 farms in the United States were receiving any sort of electric service. This number has steadily increased until on January 1st, 1929, it had reached 500,000, or slightly less than 10 per cent of the total number of farms in the country. A survey made by the Committee on the Relation of Electricity to Agriculture, covering 31 states, shows that out of 3,911,024 farms 388,791, or 9.9 per cent, are now receiving central station service. No less than 16 of these states have over 10,000 electrified farms. In 17 states more than 10 per cent of the farms are electrified.

It is interesting to note that in all of these 17 states the percentage of farm tenancy—which is 38.6 per cent for the whole United States—is low. In the six West Coast States it ranges from 7.9 per cent in Nevada to 24.4 per cent in Idaho. The average of farm incomes for these six states is very high, reaching the index number of 257 for Nevada as compared to 100 for the United States. Undoubtedly the primary factor behind rural electric development in this group of states has been the irrigation pumping load which insured sufficient use of electric energy to justify the necessary expenditures for line construction and operating equipment.

Turning to the nine states ranging from Pennsylvania to Maine, the report tells us that "so far as can be learned, farmer initiative has been behind the extension of lines in this region." While these states may be considered as the most conservative agricultural region in the United States, the number of farms connected with "high lines" furnishes striking evidence of the value which the farmers place upon electric service. Here, again, we find the percentage of farm tenancy remarkably low, ranging from 3.4 in Maine, to 17.4 per cent in Pennsylvania.

In Ohio and Wisconsin, which represent the Middle West in the 10 per cent or over classification (states where 10 per cent or more of the farms are electrified), it is again found that the percentage of farm tenancy is low. This seems to have some special significance. According to Doctor White "it might be inferred that, while not mutually exclusive, farm tenancy and electricity are not compatible. It may be that electricity will become an important factor contributing to the decrease in tenant farming." In all of these 17 states, either dairying or poultry raising (usually both) is an important agricultural industry and in many of them vegetable growing or fruit raising is also important.

Just how the farmer values different types of electrical equipment is interesting. In attempting to present a national picture, Doctor White finds that electric lights seem to come first in importance. Next are small appliances, among which the electric iron seems to be the most popular. These are followed by washing machines, water systems, electric ranges and cooking appliances, refrigerators, radios, room heaters, water heaters and ironing machines. It is interesting to note, in this national picture, the high percentage of equipment which has to do with the improvement of living conditions in the home. In other words, the farmer is quite as much of a social person as the urban dweller and thinks of his daily life in terms of his home and directs his efforts, first of all, to an improvement of conditions there.

Of course, in specialized types of agriculture, such as dairy farming, poultry raising and vegetable growing, other types of equipment take the place of some of those in this list in importance. For example, more electrical energy is used for irrigation pumping than for all other electrically performed agricultural operations, including household uses.

Providing the farmer with equipment which will use enough current to make the electrification of his farm financially sound has been something of a problem. In the February number of the Bulletin I quoted a friend of mine, who has a completely electrified farm, as saying: "Many farmers who today are prosperous because of electrification combined with scientific methods of farming were as good as bankrupt a few years ago. In order to turn them into profitable customers the light and power company may have acted as banker in the purchase of equipment. This is simply another phase of the financial problem which sometimes may be expensive but which, as I understand it, cannot be reflected in the rates." This is true. The light and power industry must make it possible for the farmer to consume enough kilowatt hours a year to make the investment required to reach him with the power lines worth something, and at the same time it must see to it that the use of the equipment and the electrical energy is profitable to the farmer.

A financial analysis of the effects of the use of electricity on the farm presents a great deal of difficulty. A well known professor, after examining a manuscript of a bulletin on farm management, is reported to have said: "It proves that farming is a business where a man can start with nothing, lose money every year on operation, and die comfortably well off." Which is only another way of saying that until recent times farming profits have come from increment in land values. Today it is evident that profits in farming must come from operation and not in land holdings.

The report sets forth, however, a concrete illustration based on five farms in what is known as the Red Wing Project in Minnesota. In 1924 these farms had a gross revenue of $17,366.41. After deducting operating expenses, making adjustments for stock purchases, deferred bills, etc., these five farms seem to have produced, in the way of net revenue, $6,876.70. In 1925, this increased to $9,769.85; in 1926, to $10,630.70; and in 1927, to $12,446.62, which is an increase over 1924 of 81 per cent. However, no charge was made in these figures for loaned electrical equipment to the value of more than $16,000.00. Figuring interest and depreciation at 12½ per cent on this equipment, and deducting slightly over $2,000 for this item from the 1927 revenues, we can reach the conclusion that the increase over 1924 was something over 50 per cent. Evidently electricity on these five farms paid its way, including the additional cost of an improved standard of living.

Concluding this section of his report, Dr. White says:

"While the above is far from a complete financial analysis of these five farms as going institutions, it does clearly show the possibility of making electric service pay its way, including the additional cost of an improved standard of living.

"Stripping this proposition to its barest fundamentals, in the light of present information it is evident that the extension of electric service to the farm will involve the farmer in additional financial outlay for wiring and equipment as well as the necessity of meeting a monthly bill. Unless he is able to meet these from accumulated capital or present income, some way must be found, through the use of electricity or otherwise, to increase his present net income sufficiently to meet the costs which electric service entails. This is one of the immediate problems facing agriculture."

Getting back to my original thesis,

(*Continued on page 498*)

The Functions of Budgetary Control in Modern Electric Utility Management

A REPORT OF THE BUDGET COMMITTEE, ACCOUNTING NATIONAL SECTION, N. E. L. A., B. S. RODEY, JR., *Chairman*

A BUDGET system, which is thoughtfully designed to meet the needs of management in laying plans for future activities and in watching the results that follow as these plans are carried out, is generally acknowledged as being helpful, if not indispensable, to present day business management.

This is not true because of any magic inherent in the word "budget." But it is true because many of the methods which have been found to be effective in dealing with management problems have been developed around or as a part of budget procedure, and made easier because of the acceptance of budget principles. The electric utility management offers no different problem in this respect than any other business—for the truth is that all kinds of business have their fundamental principles and operations in common. Because of its rapid growth the electrical industry, particularly, is in a position to apply budget principles to the best advantage in maintaining a balance between the ever-expanding functions of the business and in controlling all phases of its operations.

Factors of a Sound Business

To illustrate, let us consider the following topics in relation to budget procedure:

1—Sound organization.
2—Carefully thought out plans for the future.
3—A coordinated effort and understanding among all functions of the business.
4—A follow-up by management to gauge results and apply corrective measures where neecssary.
5—Undertakings in balance with financial resources.
6—Correct thinking.
7—Acquiescence in budgets.
8—Psychological values.
9—The economic cycle.

All these considerations enter into the business conduct of soundly managed and successful enterprises, and whether or not a budget system as such is recognized as being a factor in their success, it is, nevertheless, quite generally true that operation under a well designed budget system provides the management with information and a method of approach, which may be used to instil in the minds of the whole organization, from bottom to top, an enthusiasm and respect for operations in accordance with sound business practice.

The Budget Committee desires to express its acknowledgment to Mr. C. E. Weger, Budget Director, Henry L. Doherty & Company, New York, N. Y., for his special efforts in connection with this report.

Good Organization

Let us consider first what influence budget procedure may have on good personnel organization. In the operation of the budget, one of the first things which must be accomplished is to assign definite operating or managerial responsibilities so that advance estimates may be prepared by each individual for the activities under his direction. There must be no overlapping of responsibility to result in confusion of understanding and lack of control. This means that particular individuals must budget certain results for which they alone will be responsible, and if the organization line-up does not make this clear, then it takes only a short period of operation under the budget to bring out forcibly the need for some rearrangement in the assignment of responsibilities. As a corollary this implies that the accounting procedure must be changed, if necessary, so that it will be possible to obtain from the records an expression of results which will be on a basis comparable with the estimates.

The sound organization of a group of men requires a coordinated effort and a justified confidence in each other's judgment based on their respective abilities made known to all. Accounting practice has done much to this end but even more do budget procedures disclose those executive qualifications of men which by anticipation and control get the most out of a property and insure its perpetuation under any and all conditions.

Good organization of an expending business requires continual changes in assignment and reassignment of responsibilities, a passing down of responsibilities to the younger, growing members of the personnel. Again budget practices play an important role in disclosing to the management that responsibilities are being assumed and carried on with due appreciation and ability.

Planning for the Future

That an exposition of the future possibilities of a business, expressed in the form of budget estimates, is an aid to management will be accepted almost without question. To have thought about and planned constructively for the future is in itself entirely worthwhile. This is particularly true when the detailed estimates which express these possibilities originate with the men who are in charge of each activity. The estimates are likely to prove most valuable when they are compiled from unit costs and unit quantities for both material and labor, so that a comparison with actual results may later be made. Such comparisons will naturally reveal any weakness in the original estimate to the end that subsequent estimates may be revised to approximate more nearly the results possible.

It will be said of many concerns that, owing to the peculiar and unusual conditions under which they operate, advance estimates are of little value in attempting to predetermine results by budget procedure. Of course, it is a fact that fundamental changes take place overnight to alter the basic economic balance. It may be granted in many cases that such changes cannot be foretold in a budget. However, it is a fact, too, that these exceptional special circumstances are in reality more an argument in favor of having a budget than otherwise. For the reason that if a budget plan has been laid out for the future, it requires but a short while to ascertain just what the effect of the new conditions will be, and the coordinating adjustments which may be required to again balance the budget can be worked out with the least loss of time and to the best interests of the company.

Coordination of Effort

It is a plain truth that opportunity is never any greater than the vision of possibilities, the conception of what the future has in store. A plan of taking full advantage of that future is a budget and we can only expect to realize on it if we concretely and broadly go about painting a picture of that vision. No matter how big or how successful a company may be, without having accepted this principle, its prosperity can be increased by adopting it.

The necessity for complete coordination among the various functions of a business will readily be granted. How to obtain this coordination, however, is a matter which still puzzles all and baffles many. A budget procedure can usually be worked out which inherently coordinates the several operating functions so that there will be a balance between the various activities. Since the plans and schedules have been worked out in estimate form on a coordinated basis in the budget, the various departments will automatically be in phase with one another as long as there are no basic changes after the budgeted plans were agreed upon. Further, when a basic change does appear, all departments can take cognizance of it with the least detrimental or the most beneficial effect. Moreover, each department will be bending its efforts consistently in accord with general company policies since these policies will all have been expressed in the budget estimates and be acquiesced in by the management. There can be no question but that each individual operating in accordance with the budget will direct his efforts and the efforts of the men under him into those channels which the budget indicates will be most productive.

Management Follow-Up

Management itself has a particularly important function in taking the initiative in developing plans and policies for future guidance and in providing the requisite personnel and financial resources to achieve its objectives. It is no less a responsibility of management to actively follow from day to day the results that are being secured, in order to see that these plans and policies are carried out, and that the results obtained are satisfactory.

A follow-up is one of the most vital of management considerations. Its value can hardly be overstated, yet there are many individuals in management jobs who do not appreciate this or who have not found the way to effectively carry this part of their management responsibility.

The budget process logically divides itself into three steps. First, the preparation of the original estimate; second, the comparison of the original estimate with the actual results; and third, revision of the estimate for the remainder of any period. It is the second of these steps that provides opportunity for an effective management follow-up through budget procedure.

The benefits which may be obtained from giving close attention to the comparisons of estimate with actual may be to a degree intangible, but they are nevertheless helpful and constructive. In the first place, the individual who knows that his supervisors expect to review periodically the showing which he has made in relation to the estimate which he originally set for himself, will take more interest in his estimates and more pride in his accomplishments than if no such follow-up is contemplated by him. In the second place, by reviewing these comparisons, the management is in a position to know the place in which satisfactory progress is not being made and thus immediate steps may be taken to effect some adjustment or to revise the estimates more nearly in accordance with the realization which is being attained. In the third place, the follow-up comparisons given to management represent the means for intelligently gauging the effectiveness of the individuals under his supervision. The man who takes pride in setting an ambitious estimate for himself and who can, in turn, be relied upon to carry out such an estimate, is a man that management cannot afford to overlook in making selections for advancement. And, on the other hand, eliminations may best be made from those who promise, but who do not perform.

Undertakings in Balance with Financial Resources

It is of great importance that our institutions always remain financially strong and sound. It follows, accordingly, that our undertakings should always give due consideration to the ability of the company to finance the capital requirements of all undertakings planned and on a basis that insures profitable operation over a long period of the future.

Here again the budget supplies a means of coordination to the executive responsible for finance, without which he should reluctantly assume the responsibility.

Most careful planning in advance of cash requirements is necessary to get capital at reasonably low cost, in fact, at times to command it at all. Experience has shown many of us that when we go to our banker for either temporary or permanent capital, his keen interest lies in finding out what our business has done and what its status is today, but the convictions that bring ample credit and cheap money, are convictions as to our ability to continue a satisfactory rate of earnings and control it under any and all conditions. Budget visions of the future fortified by budget comparisons of the past command the respect of capital.

While on the question of the cost or capital, let us not forget the importance of keeping down the cost of creating facilities with which to do business because fixed charges are not only a large item of expense, but they continue to accrue, in time of adversity, to the ruination of many an enterprise. Careful budgeting of construction operations and their follow-up as they progress can play a big part in keeping down fixed charges.

In other words, budget practice is a factor in reducing the fixed charges of our business at both ends. It helps reduce the amount of capital we need and by creating confidence in the minds of our bankers raises our credit and reduces the cost of the lesser amount of capital we do require.

Correct Thinking

A discourse on budgets would be incomplete without a word on the question of correct thinking. Many people who have not held executive positions look upon their daily duties as assignments that unfortunately have to be. In fact, they do not think; they merely do what they are told. We can well afford to spend some time and money to teacn this large group how to think and think correctly. The recognition of budget principles will help do this and will create an increment of increased efficiency well worth while both to the individual and the company of which he is a part. Economics and other business fundamentals enter into every man's daily work and to the extent that he learns to think of them and plan with them he becomes a bigger factor in perfecting his budget processes, enlarging his desires of performance and attaining better results.

"This is an age of realization, an age in which thought, not fortuitous circumstance dominates industry. Thinking can result only in progress. One cannot think himself into ignorance." A budget system compels thinking in terms of established facts, which tends to make the individual a student of his job with the result that more effective work is accomplished in a shorter space of time, with less supervision.

Acquiescence in Budget

It is advisable that the viewpoint of acquiesence rather than approval be taken by the management executives in considering the component parts of a budget prior to their assembly into the consolidated budget. This cooperative spirit of mutual interest is most conducive to continued initiative, permitting at all times the origination of additional considerations by either the departmental executive or the management executive. It also creates the best relationship under which the management can undertake to convince departmental executives of changes in their plans when general overall considerations have to take precedence over departmental desires.

Psychological Values

The psychological approach of both management and men to the job before them when this job has been previously analyzed and covered by a budget, pays dividends. Why? Because these men are all human and under the budget they realize that management, on whom they are dependent for progress, is cognizant of their ability to size up the problem before them and also of their comparative performance. All men have pride, ambition and capacity. They will not jointly with someone else belittle their own ability, and consequently, their budget estimate which is to be acquiesced in will be at least a creditable performance. Likewise, they will make every effort to perform in accordance with their own appraisal. This also is all equally applicable to the human qualifications of the management executive who has put his stamp of acquiescence on the budget of the business for which he is responsible to his board of directors.

Budget principles and budget procedure make this appeal to pride in our work, to a much greater extent than any other established business processes.

Courage is a vital part of success. It is a product of the inner-self and comes out as we get confidence in our ability to accomplish the things that we set ourselves to do. That necessary courage is further strengthened when we set ourselves to do with a knowledge of a coordination with our superiors both as to acquiescence in the goal we are striving for and a review of the progress we are making toward it.

The Economic Cycle

Economists are very much agreed that the economic cycle of the future will have a much narrower range than in the past. However, the reasons assigned, in many cases, seem to be only intermediate results of the real basic reasons. One of these basic reasons, and not the least important, is the adoption by business of budget principles and procedure through which to better control its present and future. There will always be periods of greater and periods of lesser prosperity, but the probability that such abnormal swings as were shown by the panic periods of the past could be forgotten if each unit of business that makes the economic cycle were under control within itself.

Conclusion

There are no written instructions or any uniformity of practice which may be used as unfailing guides for all companies. Differences in organization plans and in personnel make it impractical even for those engaged in the same industry to agree upon anything more than the fundamental principles. The reports of the Budget Committee in 1922, 1923, 1924 and 1925, may still be used as reliable sources of information concerning these general principles and the common practice of electric utility companies.

There is, however, one essential consideration in the administration of the budget in any business. Each individual and each function of the business should be responsible for budgeting its own results. Budgeting is not a function of one department or bureau, but it is the concern of all who contribute to the common result. A triumph for budgeting is a victory won by sound thinking and coordinated effort. But in the last analysis it is the attitude of the executive management which will very largely determine the size of the victory, because management alone is in a position to weigh the efforts of all departments and to pass judgment upon the results attained. If the management gives close personal attention to the budget and is entirely in sympathy with it there will no doubt result a coordination of effort, which will go a long way toward the predetermination of future results.

Thomas Alva Edison

An Appreciation

On June 6th, 1929, a great industry, assembled in Convention in Atlantic City, paused to do honor to a distinguished American citizen—Thomas Alva Edison. ▲ ▲ ▲

To him who laid the cornerstone of the structure which it represents, this book, containing the words of appreciation spoken on that day, is dedicated by the National Electric Light Association in grateful acknowledgment of its obligation to him and his accomplishments.

The Association has published in a handsome forty-page book the addresses made on the Edison Day program, June 6, of the National Electric Light Association. The dedication and table of contents are reproduced herewith. The book will be sold by the Association at 45 cents per copy in quantities up to 100. For greater quantities the price will be 40 cents per copy.

Introduction of John W. Lieb
BY
PRESTON S. ARKWRIGHT, PRESIDENT
NATIONAL ELECTRIC LIGHT ASSOCIATION
▼
Introduction of Charles L. Edgar
BY
JOHN W. LIEB
SENIOR VICE-PRESIDENT, THE NEW YORK EDISON COMPANY
▼
The Inspiration of a Name
CHARLES L. EDGAR
PRESIDENT, THE EDISON ELECTRIC ILLUMINATING COMPANY OF BOSTON
▼
The Lamp of Aladdin
BERTON BRALEY
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The Birth of the Industry
ELMER A. SPERRY, PRESIDENT
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GENERAL ELECTRIC COMPANY
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NATIONAL ELECTRIC LIGHT ASSOCIATION
420 Lexington Ave. New York, N. Y.

Substation Control Systems

A Report of the Substations Subcommittee of the Electrical Apparatus Committee, Engineering National Section, N. E. L. A.

By G. R. Milne

NOTE: The following article has been released by the Electrical Apparatus Committee in compliance with its policy of procuring early publication in the N. E. L. A. BULLETIN of reports which, on account of their brevity, can find space in this medium.

The committee believes that these brief reports will be found equally useful, in their appropriate degree, with the more elaborate serial reports.

All of the aspects of substation design are of current interest. The design of control systems, the measures taken to insure their integrity, their sources of supply, and the loads and extraneous attachments on the control bus are discussed in this report.

A STUDY has been made of the Substation Control Systems of member companies with a view of obtaining the trend in the types of circuit breaker control circuits and the source of supply for control of breakers. This study has been conducted under the direction of the Substations Subcommittee of the Electrical Apparatus Committee, Engineering National Section.

The types of control circuits have been classified with respect to the degree of supervision of the control wiring and whether breakers are trip-free under fault conditions.

The trend in control bus supply was studied to determine the number and source, the type of control bus, fusing practice and the control bus load.

Definitions

Due to the apparent difference in opinion on the meaning of the terms "trip-free" and "supervision," it seems desirable to give a clear definition of these terms as a basis of understanding of the control circuit classification in this report.

Supervision

Supervision in the sense used here is intended to apply to a circuit so designed that a break or poor contact at any point in the circuit, up to and including relay and control switch studs, will be indicated by the indicating lamps or some other warning signal. The method of supervising relay studs is illustrated by Fig. 8.

Electrically Trip-Free

An electrically operated circuit breaker is electrically trip-free when it is free to trip on any abnormal condition provided for, regardless of the position of the control switch, and will not reclose even though the control switch remains in the closing position. In this article where trip-free features are discussed, reference is made to electrically trip-free breakers.

Mechanically Trip-Free

A manually or electrically operated circuit breaker is mechanically trip-free when it is free to trip on any abnormal condition provided for, regardless of the position of the actuating of the closing mechanism by any means contemplated in the design of the breaker.

Switch Control Systems

From the replies received the following deductions are made. In regard to control circuits, most companies are not using supervision in the sense indicated above, the light indicating only the position of the breaker, the continuity of the fuses, and in some cases the continuity of the trip coil. Such important circuits as the trip wires of relays are teed to the supervised circuit.

Practically all companies reporting are using trip-free relays in the breaker closing circuits of their most modern stations.

The control circuits submitted have been divided into four general types based on degree of supervision and trip-free characteristics.

Type I.	Non-trip-free with no supervision.
Type II.	Trip-free with no supervision.
Type III.	Non-trip-free with partial supervision.
Type IV.	Trip-free with complete supervision of the trip circuit in closed and tripped position of the main breaker.

Twenty per cent of the companies reporting had Type I control systems which have no supervision of the operating equipment or wiring, the indicating lamps showing the position of the breaker only. This is shown in Fig. 1. No trip-free device is used, and it is possible to hold the breaker closed against a short circuit by keeping the closing coil energized.

Fifty per cent reported having Type II, which is trip-free, but which provides no supervision of the operating circuits of the breaker. Fig. 2 shows a typical solenoid type of breaker using a common wire to the indicating lamps, energized by a pallet at the breaker, one lamp being connected to the positive and one to the negative side of the control. While trip-free, this circuit will permit

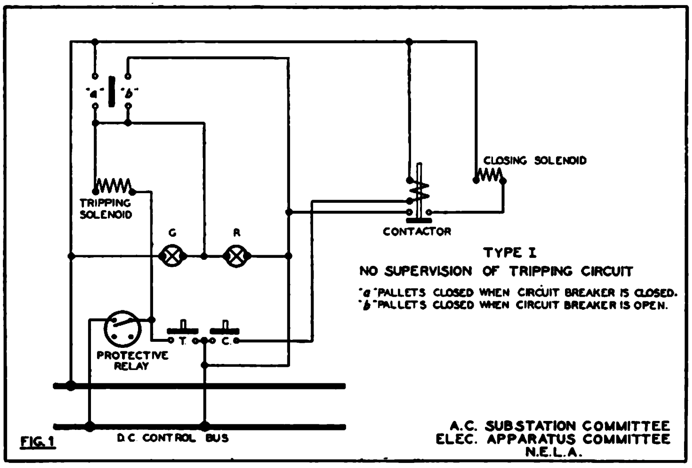

"a"
"b"
CLOSING SOLENOID
TRIPPING SOLENOID
CONTACTOR
G
R
TYPE I
NO SUPERVISION OF TRIPPING CIRCUIT
"a" PALLETS CLOSED WHEN CIRCUIT BREAKER IS CLOSED.
"b" PALLETS CLOSED WHEN CIRCUIT BREAKER IS OPEN.
PROTECTIVE RELAY
T.
C.
FIG. 1
D.C. CONTROL BUS
A.C. SUBSTATION COMMITTEE
ELEC. APPARATUS COMMITTEE
N.E.L.A.

Fig. 1

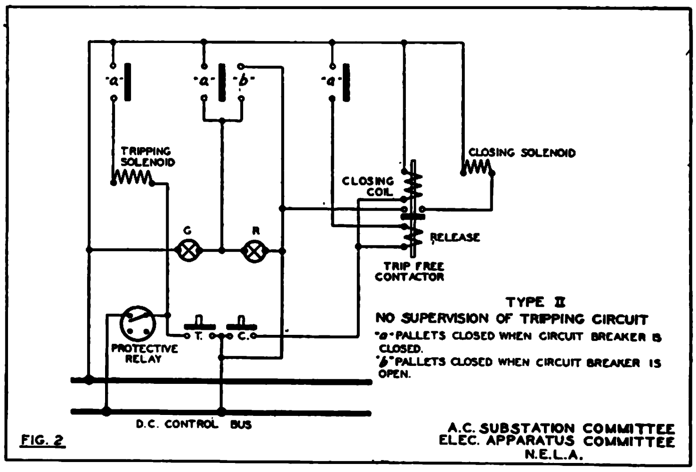
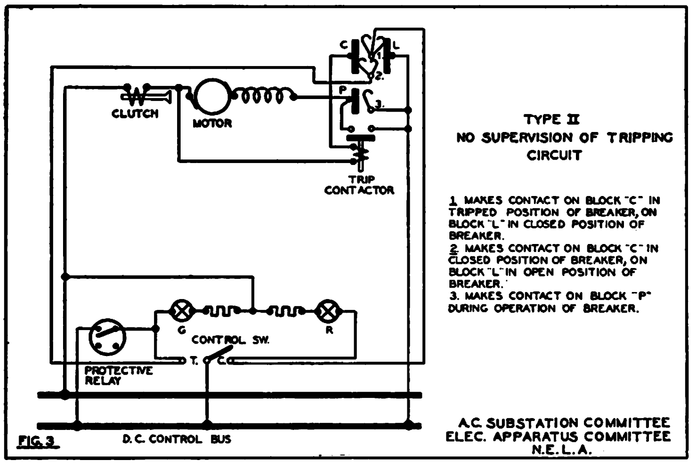

"a"
"a"
"b"
"a"
TRIPPING SOLENOID
CLOSING SOLENOID
CLOSING COIL
G
R
RELEASE
TRIP FREE CONTACTOR
TYPE II
NO SUPERVISION OF TRIPPING CIRCUIT
"a" PALLETS CLOSED WHEN CIRCUIT BREAKER IS CLOSED.
"b" PALLETS CLOSED WHEN CIRCUIT BREAKER IS OPEN.
PROTECTIVE RELAY
T.
C.
D.C. CONTROL BUS
FIG. 2
A.C. SUBSTATION COMMITTEE
ELEC. APPARATUS COMMITTEE
N.E.L.A.

Fig. 2

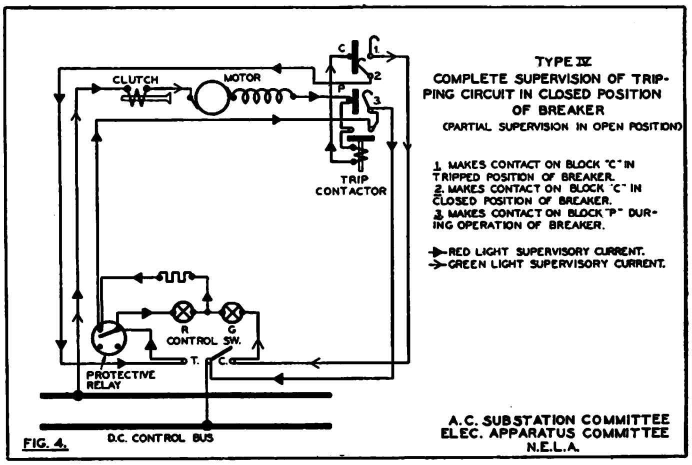

C
L
1.
2.
P
3.
CLUTCH
MOTOR
TRIP CONTACTOR
G
R
CONTROL SW.
T.
C.
PROTECTIVE RELAY
D.C. CONTROL BUS
FIG. 3

TYPE II
NO SUPERVISION OF TRIPPING CIRCUIT

1. MAKES CONTACT ON BLOCK "C" IN TRIPPED POSITION OF BREAKER, ON BLOCK "L" IN CLOSED POSITION OF BREAKER.
2. MAKES CONTACT ON BLOCK "C" IN CLOSED POSITION OF BREAKER, ON BLOCK "L" IN OPEN POSITION OF BREAKER.
3. MAKES CONTACT ON BLOCK "P" DURING OPERATION OF BREAKER.

A.C. SUBSTATION COMMITTEE
ELEC. APPARATUS COMMITTEE
N.E.L.A.

Fig. 3


C
1.
2
P
3
CLUTCH
MOTOR
TRIP CONTACTOR
R
G
CONTROL SW.
T.
C.
PROTECTIVE RELAY
D.C. CONTROL BUS
FIG. 4.

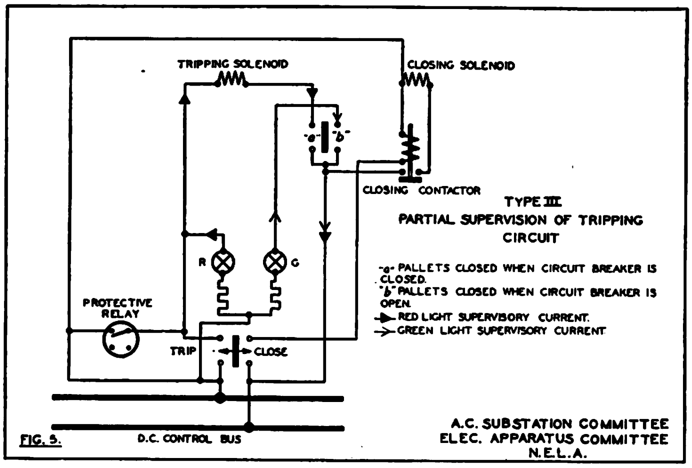
TYPE IV
COMPLETE SUPERVISION OF TRIPPING CIRCUIT IN CLOSED POSITION OF BREAKER
(PARTIAL SUPERVISION IN OPEN POSITION)

1. MAKES CONTACT ON BLOCK "C" IN TRIPPED POSITION OF BREAKER.
2. MAKES CONTACT ON BLOCK "C" IN CLOSED POSITION OF BREAKER.
3. MAKES CONTACT ON BLOCK "P" DURING OPERATION OF BREAKER.

➤ RED LIGHT SUPERVISORY CURRENT.
→ GREEN LIGHT SUPERVISORY CURRENT.

A.C. SUBSTATION COMMITTEE
ELEC. APPARATUS COMMITTEE
N.E.L.A.

Fig. 4

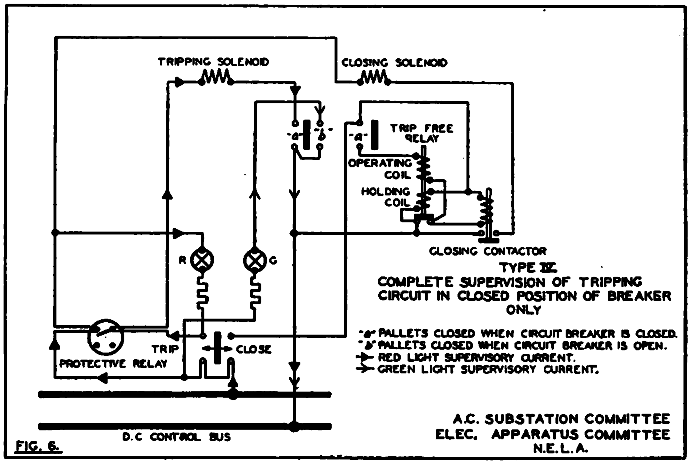

TRIPPING SOLENOID
CLOSING SOLENOID
"a"
"b"
CLOSING CONTACTOR
R
G
PROTECTIVE RELAY
TRIP
CLOSE
D.C. CONTROL BUS
FIG. 5.

TYPE III
PARTIAL SUPERVISION OF TRIPPING CIRCUIT

"a" PALLETS CLOSED WHEN CIRCUIT BREAKER IS CLOSED.
"b" PALLETS CLOSED WHEN CIRCUIT BREAKER IS OPEN.
➤ RED LIGHT SUPERVISORY CURRENT.
→ GREEN LIGHT SUPERVISORY CURRENT.

A.C. SUBSTATION COMMITTEE
ELEC. APPARATUS COMMITTEE
N.E.L.A.

Fig. 5

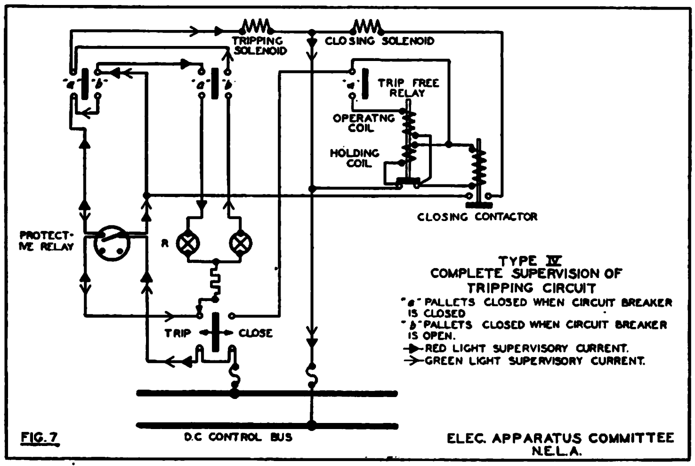

TRIPPING SOLENOID
CLOSING SOLENOID
"a"
"b"
"a"
TRIP FREE RELAY
OPERATING COIL
HOLDING COIL
CLOSING CONTACTOR
R
G
TRIP
CLOSE
PROTECTIVE RELAY
D.C CONTROL BUS
FIG. 6.

TYPE IV
COMPLETE SUPERVISION OF TRIPPING CIRCUIT IN CLOSED POSITION OF BREAKER ONLY

"a" PALLETS CLOSED WHEN CIRCUIT BREAKER IS CLOSED.
"b" PALLETS CLOSED WHEN CIRCUIT BREAKER IS OPEN.
➤ RED LIGHT SUPERVISORY CURRENT.
→ GREEN LIGHT SUPERVISORY CURRENT.

A.C. SUBSTATION COMMITTEE
ELEC. APPARATUS COMMITTEE
N.E.L.A.

Fig. 6

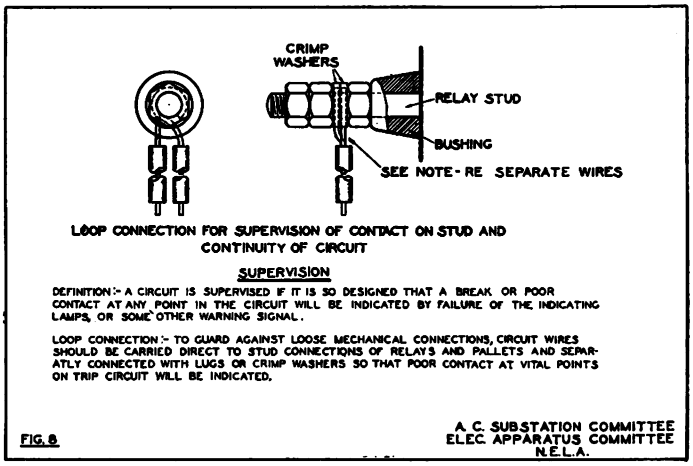

TRIPPING SOLENOID
CLOSING SOLENOID
"a"
"b"
"a"
"b"
"a"
TRIP FREE RELAY
OPERATNG COIL
HOLDING COIL
CLOSING CONTACTOR
PROTECTIVE RELAY
R
TRIP
CLOSE
D.C CONTROL BUS
FIG. 7

TYPE IV
COMPLETE SUPERVISION OF TRIPPING CIRCUIT

"a" PALLETS CLOSED WHEN CIRCUIT BREAKER IS CLOSED
"b" PALLETS CLOSED WHEN CIRCUIT BREAKER IS OPEN.
➤ RED LIGHT SUPERVISORY CURRENT.
→ GREEN LIGHT SUPERVISORY CURRENT.

ELEC. APPARATUS COMMITTEE
N.E.L.A.

Fig. 7


CRIMP WASHERS
RELAY STUD
BUSHING
SEE NOTE-RE SEPARATE WIRES
FIG. 8

LOOP CONNECTION FOR SUPERVISION OF CONTACT ON STUD AND CONTINUITY OF CIRCUIT

SUPERVISION

DEFINITION:- A CIRCUIT IS SUPERVISED IF IT IS SO DESIGNED THAT A BREAK OR POOR CONTACT AT ANY POINT IN THE CIRCUIT WILL BE INDICATED BY FAILURE OF THE INDICATING LAMPS, OR SOME OTHER WARNING SIGNAL.

LOOP CONNECTION:- TO GUARD AGAINST LOOSE MECHANICAL CONNECTIONS, CIRCUIT WIRES SHOULD BE CARRIED DIRECT TO STUD CONNECTIONS OF RELAYS AND PALLETS AND SEPARATLY CONNECTED WITH LUGS OR CRIMP WASHERS SO THAT POOR CONTACT AT VITAL POINTS ON TRIP CIRCUIT WILL BE INDICATED.

A. C. SUBSTATION COMMITTEE
ELEC. APPARATUS COMMITTEE
N.E.L.A.

Fig. 8

pumping if the control handle is held closed. Fig. 3 shows a similar arrangement for a motor-operated breaker in which the motor action gives a time element of delay which makes the circuit semi-trip-free. Fig. 4 shows a modification of this circuit which gives supervision of the trip circuit.

Twenty per cent reported using Type III circuit which is not trip-free, but which gives partial supervision of the trip coil and pallet as shown in Fig. 5. The modification of this circuit, shown in Fig. 6, includes a trip-free relay and complete supervision of the tripping circuit in the closed position of the breaker only.

The remaining 10 per cent are using modifications of Type IV, which includes those arrangements which afford full supervision of the tripping circuit in both the open and closed positions, of which Fig. 7 is typical. This arrangement includes some supervision of the closing circuit, though it seems to be the general opinion that this is more complicated than is warranted.

SUMMARIES OF CONTROL, SUPPLY AND PROTECTION

CIRCUIT BREAKER CONTROL

CO. NO.	TYPE OF WIRING SEE SKETCH	TRIP FREE (WILL NOT HOLD IN NOR PUMP AGAINST SHORT)	SUPERVISION				PERCENT OF OPERATING VOLTAGE REQUIRED	
			TRIP CIRCUIT		CLOSING CIRCUIT			
			BREAKER OPEN	BREAKER CLOSED	BREAKER CLOSED	BREAKER OPEN	TO TRIP	TO CLOSE
EXAMPLE	IV	YES	YES	YES	YES	NO	50%	65%
1	II	YES						
2	I & II	YES		PARTIAL COIL & PALLET			60%	80%
3	III	MECHANICAL		TRIP & PALLET			55%	65%
4	II	YES	NO	NO	NO	NO		
5	II	YES	NO	NO	NO	NO	56%	70%
6	II	YES	NO	NO	NO	NO		
7	I	EQUIVALENT	NO	NO	NO	NO	55%	70%
8	I & II	SEMI TRIP FREE	NO	NO	NO	NO	50%	65%
9	II & IV	YES	NO	YES	NO	NO	56%	56%
10	REMOTE CONTROL	YES	NO	NO	NO	NO		
11	I, II & III	NO	NO	YES	NO	NO	55%	70%
12	I & III	YES	NO	YES-PARTIAL	NO	NO		
13	II	YES	NO	NO	NO	NO	65%	65%
14	I & II	YES	NO	NO	NO	NO		
15	I & IV	YES	NO	YES	NO	NO		
16	IV	YES	YES	YES	PARTIAL	PARTIAL	50%	70%
17	III	YES	NO	YES-PARTIAL	NO	NO	MANUFACTURERS	RECOMMENDATION
18	II	YES	NO	NO	NO	NO	50%	69%
19	I & II	YES-PARTIAL	NO	NO	NO	NO	65%	70%
20	IV FIG. 7	YES	YES	YES	NO	NO	56%	72%

Fig. 9
Circuit Breaker Control

ALTERNATING CURRENT SUPPLY

CO. NO.	NO. OF SOURCES	SOURCES
EXAMPLE	2	1-FEEDER FROM STATION BUS THRU STATION SERVICE TRANSFORMERS. 1-FEEDER FROM ANOTHER SUBSTATION—2 BANKS OF STATION SERVICE TRANSFORMERS AVAILABLE.
1	1	STATION CIRCUIT
2	1	1-STATION CIRCUIT FROM STATION BUS THRU STATION SERVICE TRANSFORMER.
3	2	1-STATION BUS TO HOUSE SERVICE TRANSFORMER. 1 FEEDER FROM OUTSIDE SOURCE TO SERVICE TRANSFORMER.
4		
5	2	1 STATION BANK FROM 4325V. BUS. SOME CASES TWO POWER BANKS INSTALLED. 1 STREET SERVICE-4325V. FROM OTHER SUBSTATION.
6	1	STATION CIRCUIT
7	1	STATION CIRCUIT
8	2	STATION SERVICE TRANSFORMERS-2 BANKS
9	2	STATION SERVICE TRANSFORMERS-2 BANKS FROM SEPARATE SECTIONS OF BUS.
10	1	STATION CIRCUIT
11	1	STATION CIRCUIT
12	1	STATION CIRCUIT
13	3	1-STATION LOW VOLTAGE BUS FROM 2 TRANSFORMER BANKS.-1 FEEDER FROM 2 AUXILIARY SERVICE BUSES.
14	1	STATION CIRCUIT
15	1	STATION CIRCUIT
16	2	STATION CIRCUIT-MAIN & AUXILIARY LEAD TO TWO BANKS OF TRANSFORMERS.
17	1	STATION AUXILIARY SUPPLY—THIS IS A MANUFACTURERS RECOMMENDATION.
18	1	STATION BUS AND SERVICE TRANSFORMERS.
19	1	STATION BUS AND SERVICE TRANSFORMERS.
20	2	2 FEEDERS FROM SEPARATE SECTIONS OF BUS. 2 BANKS OF SERVICE TRANSFORMERS.

Fig. 10
Alternating Current Supply

SUMMARIES OF CONTROL, SUPPLY AND PROTECTION

DIRECT CURRENT SUPPLY

CO. NO.	NUMBER OF SOURCES	NO. OF MOTOR GEN'S	SIZE IN K.W.	NO. OF BATTERIES	SIZE IN AMP. HRS.	SERVICE VOLTAGE	METHOD OF CHARGING	D.C. FEEDERS FROM OTHER SOURCES
EXAMPLE	3	2	4.5	1	60	125	FLOATING WITH PERIODIC OVERCHARGE	1-3 WIRE 120-240 VOLTS
1	2	1				125	FLOATING	
2	2	1	2 TO 7.5	1	80	125	FLOATING WITH PERIODIC OVERCHARGE	NONE
3	2	1	4.5 7	1	90 AT 1 HOUR 180 AT 1 HOUR	125	FLOATING	NONE
4	2	1		1		125	FLOATING	
5	2	1	10	1	60	1·20 126	FLOATING	
6	2	1	4.5	1		125	PERIODIC AND FLOATING	
7	2	2	5	1	165	125	FLOATING	
8	2	1	10	1	125-5 HRS.	225	FLOATING	
9	3	2	5	1	160	125	FLOATING TRICKLE CHARGE	
10	2	1	4.75	1		115	FLOATING	
11	1	1	1-1.5	1		125	FLOATING TRICKLE CHARGE	1 SPARE EXCITER R.R. BUS
12	2	1		1		125		
13	4	3	15-80-90	1	175	140	FLOATING	
14	1	1	3.5	1		125	FLOATING OVERCHARGE ONCE A YEAR	
15	1	TUNGAR		1		30		
16	2	1 & 2	5 & EXCITERS	1 & 2	60 & LARGER	240	PERIODIC AND FLOATING	2 BATTERIES WHERE ONLY 1 M.G. SET IS AVAILABLE
17	2	1	1 TO 2	1	DEPENDS ON OTHER SOURCES		FLOATING TRICKLE	MFGRS. SPECIFICATION
18	2 & 3	1 & 2	1,5,10	1	100-200	125	FLOATING TRICKLE OVERCHARGE	1 FROM COMMERCIAL FEED OR 1 SPARE M.G. SET
19	2	1	400 W. FOR 32V. 1 TO 1.75 FOR 125V.	1	80 FOR 32V. 160 FOR 400V.	32 125	FLOATING LARGE PORTABLE SET AVAILABLE	NONE
20	3	2	5	1	60	125	PERIODIC AND FLOATING D.C.	

Fig. 11
Direct Current Supply

DIRECT CURRENT LOAD

CO. NO.	LOAD ON CONTROL BUS		FUSE RATING			REMARKS— INFORMATION OF INTEREST
	EMERGENCY LIGHTS—AMPS.	OTHER LOAD AMPS.	ON CLOSING CIRCUITS	RELAY & TRIP CIRCUITS	EMERGENCY LIGHTS ETC.	
EXAMPLE	20 AMPS.-MAX.	METER CLOCKS ETC.	200% OF CLOSING CURRENT 60 AMPS. MIN.	30 AMPS.	4 CIRCUITS 10 AMPS. EACH	
1			BASED ON	LOAD		
2	14 AMPS.-MAX.	NONE	NEXT SIZE UNDER CLOSING	30 AMPS.	1 OR 2 CIRCUITS 10 AMPS.	
3	10 AMPS.-MAX.	NONE	NEXT SIZE ABOVE CLOSING	NONE	30 AMPS.	
4						
5	20 AMPS.-MAX.	GRAPHIC-2 AMPS.	75 TO 90% OF CLOSING	30 AMPS. FOR RELAY 60 AMPS. FOR TRIP	4 CIRCUITS 30 AMPS.	
6			NEXT SIZE UNDER CLOSING			
7		GRAPHIC	PROTECT. WIRING		FROM 2 LAMPS TO ½ OF ALL LIGHTS	
8	25 AMPS.	METER CLOCKS ETC.	100 AMPS.	30 AMPS.		
9	120 AMPS. MAX.	PILOT LAMPS	UNFUSED	UNFUSED	10 AMPS. PER CIRCUIT	
10						
11			MANUFACTURERS	RECOMMENDATION		
12						
13	40 AMPS.	PULVERIZED COAL FEED MOTOR	30 TO 60	30 TO 60	30 AMPS.	BOILER COAL FEED MOTORS CARRIED ON CONTROL SYSTEM
14			NEXT SIZE ABOVE CLOSING			
15						
16	20 AMPS. TO ALL STA. LIGHTS	METERS ETC.	NEXT SIZE ABOVE CLOSING	30 AMPS	30 AMPS.	AUTOMATIC THROWOVER ON EMERGENCY LIGHTS
17			75% OF MAX.	SERVICE DE-	MAND	MANUFACTURERS RECOMMENDATION
18	20 AMPS.	PILOT LAMPS	200% OF CLOSING	30 AMPS.	2 TO 4 CIRCUITS 10 AMPS.	BATT. NOT FUSED. M.G. HAVE R.C.&O. CIR. BREAKER
19	2-15 A. MAX. 32V. 3-25A. MAX. 125V.	2 AMPS. 5 AMPS.	150% OF CLOSING	60 AMPS.	2 TO 10 AMPS. 4 TO 10 CIRCUITS	32 VOLTS 125 VOLTS} EMERGENCY LIGHTS AUTOMATIC
20	17 AMPS. MAX.	SIGNAL LAMPS.	80 TO 200% OF CLOSING	CLOSING CIRCUIT FUSES USED	2 CIRCUITS 15 AMPS. EACH	

Fig. 12
Direct Current Load

CONTROL SUPPLY SYSTEMS FOR A. C. SUBSTATIONS

Source of Supply

The control bus load is furnished by a combination of a motor-generator set and a battery. The battery is connected solidly to the control bus except for fuses and is continuously floated on the motor-generator set. The motor-generator set furnishes the continuous load such as indicating lamps and holding coils and the floating or charging current to the battery. Owing to the small capacity and drooping characteristic of the motor-generator set the large momentary current demands such as are required to close the larger circuit breakers are derived almost wholly from the battery.

The power supply for the motor-generator set in practically all cases was the house feeder. In five cases an extra bank was available in an emergency and in one instance a company reported an arrangement whereby one bank is fed from the primary and one from the secondary of the main station transformer. This refers particularly to 125 volt control usually involving comparatively large currents for the closing of circuit breakers and frequently some capacity to care for emergency lighting requirements.

The one exception to the above is the use of a 48 volt battery charged by a bulb rectifier, in a non-attended automatic substation. For 24 or 48 volt control which is commonly used when the service is light such as tripping only of circuit breakers or for the operation of supervisory control equipment, it is customary to float the battery on a rectifier usually of the bulb type regulating the floating and charging current by means of a rheostat.

Two companies reported batteries as the main source of the D.C. control in some of their stations; the batteries being charged daily or as required by the service imposed on them. The motor-generator sets usually varied from 1.0 to 10 kw. Where the larger size of motor-generator sets are used, undoubtedly a large floating load exists. For instance, the use of a 10 kw. set with the 120 ampere-hour battery would mean that it would be necessary to have a connected continuous load of 55 to 65 amperes in order to utilize the full capacity of the generator at any time. A 120 ampere-hour battery at the 8 hour rate floated on a 10 kw. generator under normal floating conditions and supplying a load of 20 indicating lamps will be operating at a load of only 3 per cent. The average size of battery for substations reported was 60 cell, 44 ampere-hours (8 hours), although use of 60, 80 and 120 ampere-hour batteries was also reported.

It has been determined that the 140 volt generators which have been designed particularly for floating 125 volt control batteries are capable of stable operation at the floating voltage of 129 at loads as low as 15 per cent of full rated load. Also it is not considered necessary to include any more than 25 to 50 per cent of the normal charge rate of the battery in the generator capacity in addition to the continuous load requirements. It is felt that the application of the proper size motor-generator set is of extreme importance if the maximum of life and reliability are to be obtained from the control battery.

Although some companies report that the battery is periodically given an overcharge to take care of unequal charging of the cells or a greater drain on the battery than which is replaced by the trickle charge, for the past several years the instructions issued by the storage battery manufacturers have included a statement that regular equalizing charges are not required with a properly floated battery. The necessity for equalizing charges with a properly floated battery will occur very rarely. Excessive charging of the battery has a marked effect on its length of service.

The above information has been tabulated and is shown in the accompanying tables, Fig. 9, 10, 11 and 12.

Control Bus

General tendency is to provide a single control bus to which all circuits are connected, but some cases were reported where two control buses were used, one located at the control board and one at the circuit breaker. This is especially true where breakers requiring heavy closing current are located at some distance from the board control bus and it would be uneconomical to run a separate heavy feed for each breaker. In a few cases of large substations, control bus circuits were arranged in two or three groups which were tied together through fused connections.

Fusing Practice

Circuit connections to the control bus as reported are made by means of fused knife switches except on the D.C. end of motor-generator sets, which are provided with an automatic switch, usually an air-circuit breaker, arranged to open on reverse energy or on failure of supply on the A.C. end of the set.

No general practice regarding size of fuses is obtainable from replies submitted. It is customary to fuse the main battery leads with a fuse rated the same as the one-minute rating of the battery down to 1.75 volts per cell. The purpose of these fuses is only for the protection of the wiring, as the battery itself cannot be harmed in any other way than to become discharged, even by a direct short circuit. Generally, provision is made in fusing for the possibility of closing two oil circuit breakers simultaneously.

Load on Control Bus

The continuous load on the control bus is relatively small consisting mainly of signal lamps. No use of A.C. supply for signal lamps is reported. In some cases additional load consisting of recording instruments, certain kinds of relays and in automatic substations M-G set control and supervisory control equipment are added.

Some companies believe it advisable to install a battery of sufficient capacity to furnish the maximum load requirement for a 12-hour period for all manually controlled stations, and for all automatic stations to provide for 24-hour protection, or to furnish the required load for the maximum time between inspection in non-attended automatic stations, particularly when located in isolated sections.

Intermittent load consists of opening and closing oil circuit breakers, emergency station lights, relays, alarm bells and automatic reclosing devices. As stated above, the closing current of two oil circuit breakers added to the normal load is generally considered the maximum intermittent load to be provided for, although some feel that there is a remote possibility of closing more than one breaker simultaneously where less than five breakers are installed.

Tripping currents are not considered a governing factor being relatively much smaller than closing currents except in the case of certain motor-operated breakers.

Certain emergency station lights are usually wired to an automatic or hand-operated switch arranged for connection to the control bus in case of failure of the A.C. supply.

Some companies report operating a few lights in vital locations from the control bus at all times.

Summary of Practice

The general tendency is to use "trip-free" relays in the circuit breaker closing circuits.

In regard to control circuits, the general tendency is not to supervise, as defined, either closing or tripping circuits in either the closed or tripped position of the circuit breaker.

The general tendency is to have one A.C. source, the house feeder, as the supply for the control system. A single D.C. control bus is supplied from a motor-generator set and storage battery, the battery floating on the motor-generator at all times.

The companies reporting showed a tendency toward the use of 125 volts as the voltage of the D.C. control bus.

Automobile Accident Classification

An Aid in the Prevention of Traffic Accidents

A REPORT OF THE ACCIDENT PREVENTION COMMITTEE SUBCOMMITTEE ON AUTOMOBILE ACCIDENTS, W. E. SANFORD, *Chairman*

EDITOR'S NOTE: Most electricity supply companies operate large fleets of automotive vehicles consisting of heavy and light trucks, passenger vehicles and very often motorcycles or motorcycle side cars. The safe operation of these fleets requires the same consideration of the hazards of roadway traffic that is devoted to the hazards that are peculiar to our business. In a sense, it is of special importance that electrical utilities should give this subject consideration, since in the nature of things, their vehicles are on the highways only in the fulfillment of various missions devoted to the public service and it is therefore especially appropriate that they should not be involved in any avoidable traffic accidents.

The following report has been prepared by a subcommittee on Automobile Accidents of the Accident Prevention Committee of the N. E. L. A., under the chairmanship of Mr. W. E. Sanford; this committee in preparing its report acted jointly with members of the subcommittee on Automobile Accidents of the Accident Prevention Committee of the Metropolitan New York Section, N. E. L. A.

THE primary objective of our work is the prevention of accidents, and if we admit that the human element is responsible for the greater part of the automobile accidents, it is evident that we must concentrate on educating *our* drivers, endeavoring before serious results can materialize to eliminate those who refuse to profit by the education.

While it is impossible to prophesy the possible results of an accident if the conditions were slightly different, yet it should be possible to judge a case according to fixed rules so as to set up a danger signal on the records when an unnecessary chance is taken.

The Classification Chart proposed and reproduced herewith, provides a standard form to accomplish the following purposes:

1st. By "Degree of Hazard" to indicate an average severity rate which would show the trend of the experience of the fleet of the individual organization, and provide a fairly accurate method of comparing the experience of any fleets, due allowance to be made for different traffic conditions encountered in the territory covered by the fleets under comparison.

2nd. By "Degree of Hazard," "Responsibility," and "Cause" classifications, to provide a means of tabulating the records of the individual operators so that the operator's record card will give a clear-cut story of the individual accident experience.

AUTOMOBILE ACCIDENT CLASSIFICATION CHART

DEGREE OF HAZARD

"A"—MAJOR HAZARD
"B"—MINOR HAZARD

RESPONSIBILITY

1—COMPANY DRIVER
2—OTHER DRIVER
3—PEDESTRIAN
4—THIRD PARTY
5—UNCLASSIFIED

NOTE: Responsibility Classification to be followed by a question mark when some contributory responsibility is indicated by the facts. As — "A" — R2? C2 (a). "A" = Degree of Hazard; R2 = Responsibility, Other Driver; ? = Some Divided Responsibility; C2 (a) = Cause; Failure to grant right of way.

CAUSES

1—POOR JUDGMENT

a) Following or Passing too Closely
b) Too Fast for Conditions
c) Backing Up
d) Leaving Curb
e) Inattentive Driving
f) Passing Turning or Backing Vehicles

2—VIOLATION OF TRAFFIC REGULATIONS

a) Failure to Grant Right of Way
b) Improper Turn
c) Overtaking on Wrong Side
d) Driving on Wrong Side of Roadway.
e) Disregard of Traffic Signals or Lights
f) Pulling Out of Line
g) Improper Parking
h) Reckless Driving
i) Intoxication

3—DEFECT IN MECHANISM OR EQUIPMENT

a) Brakes
b) Steering Gear
c) Faulty Lights
d) Other Defects

4—UNCLASSIFIED

a) Inexperienced
b) Physically or Mentally Unfit
c) Avoiding Pedestrian
d) Not Connected with Driving Ability

NOTE: See Definitions

NOTES AND DEFINITIONS TO AUTOMOBILE ACCIDENT CLASSICATION CHART

DEGREE OF HAZARD

"A" Major Hazard.
"B" Minor Hazard.

Class "A" to apply to all accidents indicating a potential serious hazard due to any of the following:

1. Loss of control due to any cause.
2. Speeds in excess of a safe rate for conditions as indicated by report (judgment to be based on reported speed qualified by mechanical damage and other evidence).
3. Any contact with pedestrians.
4. Carelessness or reckless driving indicated by the evidence.

Class "B" to include all accidents not covered by Class "A".

NOTE: The fact that property damage or personal injury claims are made should not prejudice the case against the driver when such claims are clearly unjustified. In considering mechanical damages, judgment should be based on the forces involved rather than on the cost of repairs.

It is thought that attempting more

than two grades of classification would only complicate the work without any particular advantage being gained. In the classification of accidents the value lies more in obtaining a fair average than in expecting a one-hundred per cent perfection in each individual case. It is therefore recommended that grades "A" and "B" be adopted. Grades to be determined by consideration of driver's report and all other available evidence.

RESPONSIBILITY

In some cases, the responsibility is very clear cut. In others, while the evidence may point definitely to one party as responsible, there is often evidence that there may have been contributory negligence on the part of others. To obtain an accurate record of a driver's performance, this condition should be indicated. Where two or three accidents have been experienced by a driver, even though charged to "Others Responsible," they should be carefully considered when this is apparent. (See specimen driver's record card.)

CAUSES

(More than one cause should be indicated if apparent)

It is important that Basic Causes be shown, rather than resultants such as "Skidding," "Loss of Control," etc., which are not causes of accidents.

To clarify the meanings, the various causes have been grouped under explanatory headings.

POOR JUDGMENT

1 (a) "Following or Passing Too Closely" is intended to cover cases of striking vehicle ahead at a sudden stop, striking stationary objects or vehicles or even a moving vehicle where other negligence is not apparent.

1 (b) "Too Fast for Conditions"—Closely related to 1 (a), is often the cause of skidding or other loss of control.

1 (c) "Backing Up"—Cases where driver does not assure himself that way is clear before backing.

1 (d) "Leaving Curb"—similar to 1 (c).

1 (e) "Inattentive Driving"—this condition must be judged by the evidence available, and covers day-dreaming, allowing attention to be diverted, etc.

1 (f) "Passing Turning or Backing Vehicles"—covers cases of trying to slip by a vehicle making a turn when the purpose of the other driver is evident. Where the turning or backing driver has not given fair warning and assured himself of a clear field, this would be charged to 1 (c) "Backing Up," 2 (b) "Improper Turn," etc.

VIOLATION OF TRAFFIC REGULATIONS

Covers violation of any local ordinance or State law.

2 (a) "Failure to Grant Right of Way"—primarily at an intersection; precedence in relation to intersection, speed and general conditions should be considered.

Name	Department	Date of Birth	Date Employed
John Jones	Storeroom	3-6-04	1-15-27

Driving experience at date of employment, 3 yrs.

Reference Number or Date of Accident	Remarks	Classification		
		Degree	Respon.	Cause
4-1-27	Struck elevated pillar to avoid taxi cutting out of line....	"A"	2(?)	2(f)
5-3-27	Struck in rear while standing in traffic	"B"	2	1(a)
7-1-28	Struck "L" structure to avoid pedestrian	"A"	3	4(c)
11-19-28	Skidded and struck parked car	"A"	1	1(b)

Specimen Driver's Record Card (4x6")

2 (b) "Improper Turn"—turning right or left at intersection contrary to traffic rules.

2 (c) "Overtaking on Wrong Side"—attempting to pass to the right of a vehicle ahead.

2 (d) "Driving on Wrong Side of Roadway"—driving on left side of a two-way traffic lane, on left side of center line in overtaking when opposing traffic is heavy.

2 (e) "Disregard of Traffic Signal or Lights"—disregard of officer, dummy signal, or automatic lights.

2 (f) "Pulling Out of Line"—cutting in and out of congested traffic lines; crowding other vehicle when cutting in.

2 (g) "Improper Parking"—Facing wrong way, too far from curb, failure to block or lock on grades, too near intersection, driveway or fire hydrant; etc.

2 (h) "Reckless Driving"—Habitual chance taking, even though excessive speed is not indicated.

2 (i) "Intoxication"—When driving is a violation of law in most States, but can be used in case of Pedestrian or Third Party as cause of accident if indicated.

DEFECT IN MECHANISM OR EQUIPMENT

Items need little definition except 3 (c) "Improper Lights" which covers—lack of lights, improperly placed, or glaring lights.

UNCLASSIFIED

4 (a) "Inexperienced"—an operator who has had little road practice.

4 (b) "Physically and Mentally Unfit"—Physically unfit to cover cases of poor eyesight, permanent defects, inherent weakness, exhaustion due to long tour of duty; etc. Mentally unfit to cover cases where severe nerve strain, family worries, etc., can be substantiated.

4 (c) "Avoiding Pedestrian"—striking other vehicles or obstruction in avoiding children or others on the highway.

4 (d) "Not Connected with Driving Ability"—To cover accidents in which the operator's driving ability is not involved.

EXAMPLES

1. Car "A" travelling south at 15 m.p.h., 3 feet from west curb; weather clear; daylight; street wide and good condition; little traffic, Car "B" travelling north at 25 m.p.h., crosses over and strikes Car "A" head on. "A" is Company Car. Classification R2—C1(e).
2. Car "A" travelling south on main thoroughfare at 20 m.p.h. is struck between front and rear wheels by Car "B" travelling east at 20 or more m.p.h.; weather, light and street conditions good. Car "A" apparently reached intersection first but some doubt exists, and Company driver should play safe and drive 60% to 40% for others. Classification is R1?—C2(a). The question mark after R1 on the operator's record card indicates that some doubt exists, and is favorable to his record.

Contemplating Rural Electrification

(Continued from page 488)

which was, if I may be permitted to put it in words of one syllable, that folks who call upon the light and power industry to discharge its obligation to society by electrifying all the farms in the United States don't know what they are talking about, I wish to submit that the industry has been doing everything that it could possibly think of to this end for years. It has been educating its own people and it has been doing its best to inform the farmer. It has conducted all sorts of experimental enterprises to prove to the farmer that electrification is to his economic benefit and to prove to the light and power companies that the agricultural load can be made to pay in spite of the high cost of reaching the farmer and in spite of the financial help which they may be called upon to give him in the purchase of equipment until that equipment pays for itself. It has brought the situation to a point where rural electrification is proven to be a sound enterprise, except in a few unusual areas. It is with considerable confidence that I say that this movement will go forward with increasing speed, and our doctrinaires need give themselves no concern about the matter.

Papers Submitted in Prize Awards Contest Now Available to Members

THE BULLETIN publishes below and on succeeding pages a partial list of papers entered in the 1928-1929 competition for the various prize awards offered annually under the auspices of the Association. Remaining papers will be listed in the next issue of the BULLETIN.

The Association will be glad to loan any of the papers listed upon application to the Secretary, National Electric Light Association, 420 Lexington Avenue, New York, N. Y. (With the exception of the prize winning papers. These are to be published during the year in the N. E. L. A. BULLETIN.)

Such requests for loans will be filled in the order of receipt.

The listing of papers according to the prizes for which they were submitted, or by groups as commercial, accounting, etc., was considered but this plan was given up as impractical, for the reason that many of the papers defied such arbitrary classification due to their wide scope, and a complete analytical classification would have made too great a demand on space.

This collection of papers represents not only the best efforts of many of the intelligent and ambitious young men and women of the industry but also the seasoned reflections, or case histories of the solution of problems of importance to the industry at large, by those who have already won positions of distinction and authority.

The reception accorded the publication last year of the 1927-1928 list of papers is responsible for the publishing of this year's list. Several hundred loans were made of last year's papers and occasional requests for them are still coming to Headquarters.

An announcement of the prize awards to be offered for 1929-1930 will appear in an early issue of the N. E. L. A. BULLETIN.

PRIZE WINNING PAPERS

Prize winning papers are to be published during the year in the N. E. L. A. BULLETIN *and will not be loaned in advance of publication.*

Doherty Prize

Everett W. Vilett	Public Service Elec. & Gas Co., Newark, N. J.	"Investment Merit of the Electric Utility Industry."

Harriet Billings Prize

P. O. Johnson	Northern States Power Co., Minneapolis, Minn.	"The Human Side of a Balance Sheet."

Martin J. Insull Prize

Rob Roy MacLeod	Buffalo, Niagara & Eastern Pr. Corp., Buffalo, N. Y.	"A Public Relations Yardstick."

J. E. Davidson Prizes

First—Keo Currie and Ray Warren	Public Service Co. of Northern Illinois, Chicago, Ill.	"A Study of Merchandise Advertising."
Second—Donald D. Parry	Central Hudson Gas & Elec. Corp., Poughkeepsie, N. Y.	"Specialized Merchandising for the Central Station."
Third—Edwin Fleischmann	Niagara Falls Power Co., Niagara Falls, N. Y.	"Winter Humidity and Comfortable Homes."

James H. McGraw Prizes

First—E. B. Strowger	Niagara Falls Power Co., Niagara Falls, N. Y.	"Operating a Hydro Electric System for Best Economy."
Second—Geo. D. Nutting	Detroit Edison Co., Detroit, Mich.	"The Electric Water Heater."
Third—Francis Heisler	Public Service Co. of Northern Illinois, Chicago, Ill.	"Peak Load in Steam Plants and Its Economical Generation."

H. M. Byllesby Prizes

First—Wm. A. O'Neill	Electric Bond & Share Co., New York, N. Y.	"Six Words in an Accountant's Life."
Second—F. L. Barry	Electric Bond & Share Co., New York, N. Y.	"How to Increase the Usefulness of the Accountant in the Public Utility Industry."
Third—Harold V. Bright	Southeastern Pr. & Lt. Co., New York, N. Y.	"The Accountant in the Public Utility Industry."

Frank W. Smith Educational Prize

Raymond H. Young	Public Service Elec. & Gas Co., Camden, N. J.	

PAPERS WHICH WILL BE LOANED TO MEMBERS

Submitted by	*Employed by*	*Title of Paper*
Amspacker, N. T.	Kansas Electric Power Co., Lawrence, Kan.	"Development of the Electric Industry."
Anderson, A. A.	Pennsylvania Pr. & Lt. Co., Sunbury, Pa.	"The Power Salesman and His Problems."
Anderson, E. D.	Northern Indiana Public Service Co., Hammond, Ind.	"Service, the Vitality of Public Relations."
Andrews, Walter L.	The Dayton Pr. & Lt. Co., Dayton, Ohio	"Why Worry About Public Relations?"
Andrews, Walter L.	The Dayton Pr. & Lt. Co., Dayton, Ohio	"Who is Responsible for Proper Public Relations?"
Andrewski, H. C.	Oklahoma Gas & Electric Co., Ardmore, Okla.	"How Are Collections?"
Argus, Howard J.	Buffalo General Electric Co., Buffalo, N. Y.	" 'Public Relations' as Seen by a Right-of-Way Man."
Bagarry, A., Jr.	Central Power & Light Co., San Antonio, Tex.	"The Power and the Light of Contentment."
Bartlett, Stephen	Blackstone Valley Gas & Elec. Co., Woonsocket, R. I.	"Electricity and What it Means to the Electric Light and Power Industry."
Barton, Williamson M.	Brooklyn Edison Co., Brooklyn, N. Y.	"Public Relations."
Bass, Herbert	Northern Indiana Public Service Co., Hammond, Ind.	"Creating the Proper Public Attitude Toward Utility Companies."
Bentz, O. G.	Florida Power & Light Co., Lakeland, Fla.	"How to Improve Public Relations."
Bergmann, Walter	The New York Edison Co., New York, N. Y.	"Procedure and Accounting for Appliance Merchandising."
Bidlack, Stanley F.	The Chester Valley Electric Co., Coatesville, Pa.	"The Meaning of Rural Electrification and Some Methods for its Accomplishment."
Bird, Lee G.	The Commonwealth Edison Co., Chicago, Ill.	"Super-Service Through Inspiration."
Bock, Anna W.	The United Elec. Lt. & Pr. Co., New York, N. Y.	"Public Relations in the Electric Light and Power Industry."
Booth, A. E.	Central Hudson Gas & Elec. Corp., Poughkeepsie, N. Y.	"The Public's Ideas of the Utility Company and Method of Correcting Them."
Bradbury, Walworth K.	Buffalo, Niagara & Eastern Pr. Corp., Buffalo, N. Y.	"That's My Story and I'm Going to Stick to It."
Brainerd, Arthur A.	Philadelphia Electric Co., Philadelphia, Pa.	"Lighting Service—A Big Business Builder."
Brooks, Anthony	Interstate Public Service Co., New Albany, Ind.	"Public Relations."
Brown, Merritt M.	Pennsylvania Pr. & Lt. Co., Bethlehem, Pa.	"The Roots of Public Relations."
Bucher, Russell S.	Tonawanda Power Co., No. Tonawanda, N. Y.	"Series Street Lighting Systems."
Campbell, Bailey W.	Buffalo General Electric Co., Buffalo, N. Y.	"Public Relations."
Carpenter, Chas. J.	Public Service Elec. & Gas Co., Hackensack, N. J.	"Public Relations."
Clark, L. W.	Utica Gas & Elec. Co., Utica, N. Y.	"The Dawn of a New Economic Era for Utilities."
Clawson, L. T.	Puget Sound Pr. & Lt. Co., Olympia, Wash.	"Improving Public Relations Through the Sale of Securities."
Coleman, Joseph P.	Philadelphia Suburban Counties Gas & Elec. Co., West Chester, Pa.	"The Public is Served."
Commery, E. W.	National Lamp Works, Cleveland, Ohio	"Merchandising Methods for the Relighting of Residences."
Compton, Edward N.	Buffalo General Elec. Co., Buffalo, N. Y.	"How to Increase the Usefulness of the Accountant in the Electric Utility Industry."
Conant, L. C.	Buffalo, Niagara & Eastern Pr. Corp., Buffalo, N. Y.	"Industrial Service Department for Better Trade Relations."
Conant, L. C.	Buffalo, Niagara & Eastern Pr. Corp., Buffalo, N. Y.	"An Advertising Suggestion."
Constable, L. E.	Niagara Elec. Service Corp., Niagara Falls, N. Y.	"Creating an Interest in Show Window Lighting."
Cook, Eula C.	Tucson Gas, Elec. Lt. & Pr. Co., Tucson, Ariz.	"Employee and Consumer."
Cooley, J. F.	Wabash Valley Elec. Co., Clinton, Ind.	"Why Electric Merchandise Sales Are in the Red."
Crane, A. J.	Commonwealth Edison Co., Chicago, Ill.	"Bootleg Public Relations."
Creelman, Charles F.	San Diego Consolidated Gas & Elec. Co., San Diego, Cal.	"How to Increase the Usefulness of the Accountant in the Public Utility Industry."
Crosby, Edward J.	The Washington Water Power Co., Spokane, Wash.	"Public Relations."
Cummings, M. L., Jr.	Utah Power & Light Co., Salt Lake City, Utah	"When Better Public Relations Are Built, the Employees Will Build Them."
Cuthers, Jno.	Utah Power & Light Co., Salt Lake City, Utah	"The Ideal Service."
Davis, Ben	Florida Pr. & Lt. Co., Miami, Fla.	"Public Relationship."
Davis, S. L.	Louisiana Pr. & Lt. Co., New Orleans, La.	"Increasing the Usefulness of the Public Utility Accountant."
Day, Herbert A.	Canada Northern Pr. Corp., Ltd., New Liskeard, Ont., Can.	"Demos.—His Opinion of Public Utilities. Can it be Changed? And How?"
Deery, Charles	Suburban Gas & Elec. Co., Revere, Mass.	"Public Relations."
Delmer, Chas. W.	West Texas Utilities Co., Rising Star, Texas	"Better Public Relations."
Denny, R. C.	San Joaquin Lt. & Pr. Corp., Fresno, Cal.	"Automatic Control of 12,000 Hp. Station."
Dickerson, Ralph A.	Public Utilities Consolidated Corp., Nogales, Ariz.	"Putting the Utility in Public Utility Accountant."
Diehl, Earle E.	The Toledo Edison Co., Toledo, Ohio	"The Electric Meter Laboratory."
Doherty, Francis X.	Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.	"Consumer Cooperation."
Doran, William T.	Niagara, Lockport & Ontario Pr. Co., Batavia, N. Y.	"Public Relationship with the Electric Light and Power Company."
Doyle, Joseph W.	The Brooklyn Edison Co., Brooklyn, N. Y.	"Wait a Minute and Save a Life."
Duryee, L. M.	Connecticut Lt. & Pr. Co., Norwalk, Conn.	"What Price Power Factor."
Egan, Etta J.	Iowa Public Service Co., Humboldt, Ia.	"Public Relations in the Electric Light and Power Industry."
Emerson, E. T.	Cumberland County Pr. & Lt. Co., Portland, Me.	"Public Relations."
Evans, William H.	The Philadelphia Elec. Co., Philadelphia, Pa.	"Telephone Courtesy."
Evans, W. M.	Duquesne Light Co., Pittsburgh, Pa.	"Apparatus Grounding Standards for Electric Public Utilities."
Eyles, Jr., A. H.	Electrolux, Inc. of N. Y., 250 Park Ave., New York, N. Y.	"A Revolutionary Method of Cleaning with Electricity."

Submitted by	*Employed by*	*Title of Paper*
Farley, C. B.	Kentucky & West Virginia Pr. Co., Inc., Pikeville, Ky.	"Public Relations in the Electric Light and Power Business."
Faxon, Brooks	Wagner Electric Corp., Boston, Mass.	"Power Factor for the Every Day Man."
Fletcher, W. C.	Keokuk Electric Co., Keokuk, Ia.	"Complaints and Good Will."
Fox, Theodore R.	Buffalo, Niagara & Eastern Pr. Corp., Buffalo, N. Y.	"The Electrical Industry."
Frame, Robert N.	Niagara, Lockport & Ontario Pr. Co., Buffalo, N. Y.	"And There Was Light."
Frame, Robert N.	Niagara, Lockport & Ontario Pr. Co., Buffalo, N. Y.	"The Engineer's Air Castles."
Friedman, M. C.	Commonwealth Edison Co., Chicago, Ill.	"The Electrical Industry in 1960."
Friedman, M. C.	Commonwealth Edison Co., Chicago, Ill.	"The Relation of Safety First to Public Good Will."
Fuller, M. A. C.	Buffalo General Elec. Co., Tonawanda, N. Y.	"Public Relations."
Gabbert, J. R.	Southern Sierras Pr. Co., Riverside, Cal.	"Public Relations in the Electric Light and Power Industry."
Gallien, Jr., Henry	New York Pr. & Light Corp., Albany, N. Y.	"Promotional Rates in Practice."
Galloway, William T.	Middle West Utilities Co., Chicago, Ill.	"Public Relations in the Field of Economics."
Garrot, Marion G.	New Orleans Public Service Co., New Orleans, La.	"Give a Thought to the Utilities."
Gibbs, W. W.	Knoxville Pr. & Lt. Co., Knoxville, Tenn.	"The Improvement of Customer Relationship in Public Utilities."
Gilliam, Chas. T.	Central Pr. & Lt. Co., San Antonio, Tex.	"The Ultimate Consumer."
Goans, J. W.	Holston River Electric Co., Rogersville, Tenn.	"Our Service Relations."
Goldkamp, Chris	San Diego Consolidated Gas & Elec. Co., San Diego, Cal.	"The Induction Watthour Meter."
Gordon, Roger A.	Blackstone Valley Gas & Elec. Co., Pawtucket, R. I.	"At Your Service."
Green, Ernest H.	Connecticut Light & Power Co., Waterbury, Conn.	"This Business of Public Relations."
Harrington, Howard L.	The Niagara Falls Pr. Co., Niagara Falls, N. Y.	"The Electric Water Heater and Its Possibilities as a Load Builder."
Harris, Annie S.	Wisconsin Pr. & Lt. Co., Mineral Point, Wis.	"Public Relations in the Electric Light and Power Industry."
Harrison, Robert C.	Commonwealth Edison Co., Chicago, Ill.	"The Holding Company in Rural Electrification."
Hartman, Edna M.	Empire District Electric Co., Joplin, Mo.	"A Public Utility and Its Public."
Hartnacke, Margaret T.	Consumers Power Co., Grand Rapids, Mich.	"The Live Wire."
Hayes, H. G.	The Ohio Public Service Co., Alliance, Ohio	"Utility Evolution: A Recapitulation and a Prophecy."
Hazlett, C. Robert	Dayton Power & Light Co., Dayton, Ohio	"A Gas Employee's View of the Electric Industry."
Heffield, A. M.	El Paso Electric Co., El Paso, Tex.	"Improving Public Relations by the District Representative Plan."
Heffield, A. M.	El Paso Electric Co., El Paso, Tex.	"District Representative Merchandising."
Henry, O. K.	1840 W. Grand Blvd., Detroit, Mich.	"The Combustion of Pulverized Coal in Boiler Furnaces."
Hogan, J. Martin and Rob Roy MacLeod	Buffalo, Niagara & Eastern Power Corp., Buffalo N. Y.	"Choosing a Bride in Business."
Hoover, Marling Morse	Dayton Power & Light Co., New Lebanon, Ohio	"Public Relations in the Electric Light and Power Industry."
Howe, Walter O.	Niagara, Lockport & Ontario Pr. Co., Olean, N. Y.	"The Electric Range."
Howell, H. I.	The Niagara Falls Pr. Co., Niagara Falls, N. Y.	"The Economic Value of Efficiency Tests on Hydro-electric Units."
Hughes, George A.	The United Electric Lt. & Pr. Co., New York, N. Y.	"The First Step in Public Relations."
Hunderup, Kennedy	Idaho Power Co., Boise, Idaho	"Reinforced Concrete as Material for Tainter Gates."
Ingram, H. L.	Pure Oil Co., Nederland, Tex.	"Remote Metering."
Iredell, Clinton	Atlantic City Electric Co., Paulsboro, N. J.	"Commercial and Merchandising Problems of Electric Light and Power Industries."
Irish, Noble G.	Niagara Electric Service Co., Niagara Falls, N. Y.	"Our Rural Territory and Its Development."
Jansen, Geo. J. and Gus S. Perkins	Buffalo General Electric Co., Buffalo, N. Y.	"Promotion of Better Public Relations in the Electric Light and Power Industry."
Johnson, Roy St. C.	Buffalo General Electric Co., Buffalo, N. Y.	"How to Increase the Usefulness of the Accountant in the Public Utility Industry."
Johnston, William S.	Niagara Electric Service Corp., Niagara Falls, N. Y.	"Merchandising Problems of the Electric Light and Power Industry."
Jones, George F.	Luzerne County Gas & Elec. Corp., Nanticoke, Pa.	"Get the Prize Ready for Jones."
Jones, J. H.	Central Illinois Public Service Co., Roodhouse, Ill.	"Public Relations."
Kane, Henry B.	Edison Elec. Illuminating Co., Boston, Mass.	"The Central Station and Traffic Signals."
Kennedy, Clifton G.	Haverhill Electric Co., Haverhill, Mass.	"Increasing the Usefulness of the Accountant in the Public Utility Industry."
Kessler, Earl	Buffalo General Electric Co., Buffalo, N. Y.	"The Electric Light and Power Industry."
Kirkendall, William E.	Los Angeles Bureau of Pr. & Lt., Los Angeles, Cal.	"The Keynote of Public Relations."
Kirkland, Asa H.	Consumers Power Co., Muskegon, Mich.	"Public Relations."
Kitchen, Robert W.	Canadian Niagara Pr. Co., Fort Erie, Ont.	"Merchandising Problem No. 5."
Kull, A. L.	Middle West Utilities Co., Chicago, Ill.	"Public Relations—What Price? What Reward?"
Landrigan, Charles R.	The Detroit Edison Co., Detroit, Mich.	"The Camera Man of the Public Utility."
Langdell, J. C.	Allied Power & Light Corp., Jackson, Mich.	"Electric Water Heating and Its Relation to Load Factor."
Lloyd, Morris H.	Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.	"Rural Service."
MacFarland, Miss Irean	Buffalo General Electric Co., Buffalo, N. Y.	"Water Power Now Wasted and Its Possibilities."
MacKenzie, A. G.	New Jersey Public Utility Info. Comm., Camden, N. J.	"Good Will Through Education."
MacLeod, Rob Roy, and J. M. Hogan	Buffalo, Niagara & Eastern Pr. Corp., Buffalo, N. Y.	"Choosing a Bride in Business."

Light's Golden Jubilee

THE progress of the plans for the celebration of Light's Golden Jubilee indicates that this world-wide demonstration of appreciation and affection for Mr. Edison will far surpass that of any popular tribute ever rendered to any person.

In proof of the public interest in the celebration are the many newspaper and magazine articles being published, the desire to participate expressed by all types of organizations from governments to civic organizations, and the communications from thousands of individuals giving whole hearted endorsement. Another indication is the fact the special Jubilee postage stamp has been purchased eagerly wherever it has been placed on sale, and an additional one hundred and fifty millions has been authorized by the Post Office Department, making a total of three hundred and thirty million to be engraved.

Activities in New England

In New England a widespread observance of Light's Golden Jubilee will take place. Events will move to a fitting climax on the night of October 21, when the dedication of the Edison Museum and Edison School of Technology at Dearborn, Mich., will attract the attention of the entire civilized world.

The Associated Industries of Massachusetts, has started a cooperative program with the Edison Electric Illuminating Company of Boston to feature the jubilee at the October exposition of the former organization, where interesting displays of Edisonia will be made in connection with exhibits of Massachusetts products. The Boston Chamber of Commerce has indicated its interest in the jubilee and it is expected that a regular luncheon meeting will be held in October at which a distinguished representative of the electrical industry will speak to 500 assembled members and guests on the significance of Edison's works and achievements.

The cooperation of many other boards of trade, chambers of commerce, etc., is well assured throughout many parts of New England. The jubilee movement impetus has thus far been apparent chiefly in the light and power industry, on account of the naturally early interest of this industry in the matter.

Activities in the Central States

The states of the central part of the country, from Canada to the Gulf of Mexico, are manifesting an enthusiastic interest in the celebration of Light's Golden Jubilee. A characteristic of many of the plans and proposals under consideration for the public commemoration of the half century birthday of the incandescent lamp is the acceptance of no small partial responsibility for the success of the celebration by other organizations—business, civic and social service—than the electric utilities alone.

To the first suggestions made at the beginning of the movement last spring, and to the later plans for their participation in the affair, there have come wholehearted responses from municipal departments, from local chambers of commerce and business men's organizations, from service groups, such as Rotary, Kiwanis and Lions clubs, from bodies concerned and associated with the primary and high schools, boards of education and parent-teacher associations, and from many other bodies of civic or semi-public character.

Pacific Coast Activities

While plans for participation in Light's Golden Jubilee celebration have not definitely been formulated, each community on the Pacific coast is entering into the spirit of the occasion and will take its place along with the rest of the nation in commemorating the fiftieth anniversary of the invention of the incandescent lamp.

In some cities special committees have been formed, while in others the movement will be sponsored by electrical cooperative leagues or local electric clubs. Portland purposes the formation of a general committee, composed of the Mayor, president of the Chamber of Commerce and other prominent people to act as a sponsoring committee, and the newly organized Portland Electric Club will likely take over the major portion of the work.

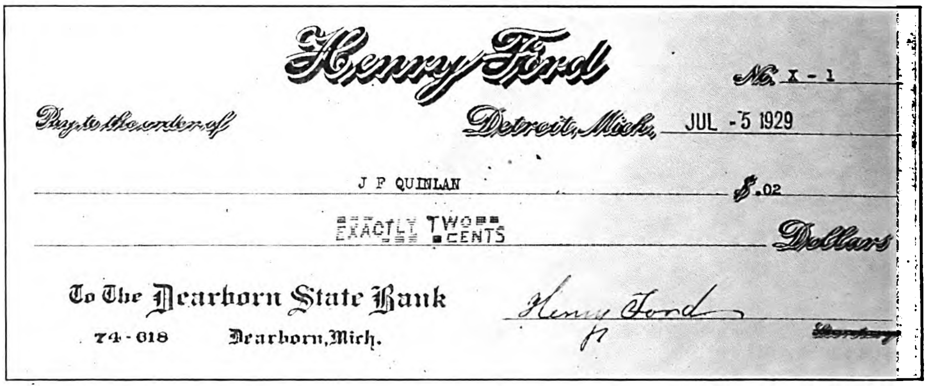
An impressive local demonstration is planned for Spokane, with attention focused on Spokane's position on the official lighted airways. Through various local channels Salt Lake will recommend intensive improvements in illumination standards and make suggestions for appropriate lighting in connection with Light's Golden Jubilee week. During that week some novel lighting effects are planned and meetings with electrical, industrial and social groups will be held.

Present indications are that Denver will make the celebration a civic affair, with the electrical industry aiding in working out plans. Some consideration has been given to an illuminated pageant. A committee has been formed in Seattle, but no definite plans have been made up to this writing.

The Industry's Part

On July 17, M. S. Sloan, president of the National Electric Light Association addressed a letter to member company executives in which he said:

> "I feel that the utility companies will want to assist in this broad national tribute to Mr. Edison by making the participation of each local community one that is in full keeping with the concept. The spirit of



Henry Ford

No. X-1

Pay to the order of

Detroit, Mich., JUL -5 1929

J F QUINLAN $.02

EXACTLY TWO CENTS Dollars

To The Dearborn State Bank

74-618 Dearborn, Mich.

Henry Ford

MOTOR MAGNATE LIQUIDATES UNUSUAL LOAN

THAT Henry Ford pays his debts promptly and considers small things equally as important as big things is evidenced by his personal check for two cents which he handed to J. F. Quinlan, executive secretary for Light's Golden Jubilee when Mr. Quinlan paid Mr. Ford a visit recently at Dearborn, Mich. It was necessary for the motor magnate, as reported in the June issue of the BULLETIN, to borrow two cents from the Jubilee secretary on the occasion of Mr. Ford's purchase of the first Edison Commemorative postage stamp to be placed on sale at Atlantic City on June 6. Mr. Ford promised at that time to repay in full.

According to Mr. Ford, this is the first personal check he has signed in five years. Mr. Quinlan has informed Mr. Ford that his checking account will forever be out of balance, for he does not intend to cash the check.

Light's Golden Jubilee, as expressed at the Atlantic City Convention, should be translated into every community in the country. It affords an opportunity for the public and the industry to express a tribute to Mr. Edison and an appreciation of his contribution to the electrical art. Already many cities and towns have plans in motion for participation.

"It is suggested that insofar as possible in each community a committee, made up of leading citizens, should be formed to develop plans and carry them through. It seems fitting that the utility company should take the initiative in promoting such a local committee.

"If you concur with the idea, may I suggest that you personally undertake the task for your community?

"I would appreciate your writing me your decision."

Responses to this letter have been pouring in which confirm the electrical industry's desire to whole-heartedly and actively participate in the celebration.

The July 20 issue of the *Electrical World* was a special Golden Jubilee number and covered in detail every phase of the celebration that has been developed so far. This issue of the *World* with the official Jubilee Book issued by Light's Golden Jubilee Committee and the "Suggestion for Local Participation," published by the National Electric Light Association should prove of great benefit in the organization of local celebrations.

Light's Golden Jubilee in Foreign Countries

ALTHOUGH at first considered as a strictly American celebration, many foreign countries are taking cognizance of Light's Golden Jubilee and are making plans for some observation of the event.

This change has come about since the convention of the National Electric Light Association, at which time the Jubilee was inaugurated. Many delegates from foreign countries were in attendance at Atlantic City and witnessed the ceremonies incident to the starting of Light's Golden Jubilee.

To give these foreign delegates a clearer conception of the purport of the Jubilee, a luncheon meeting was held at the Shelbourne Hotel on June 6 under the auspices of the Association, with S. E. Doane presiding. N. H. Boynton of Nela Park, Cleveland, explained in detail how various American communities were preparing to signalize the Fiftieth anniversary of the invention of Edison's electric incandescent lamp, and what literature was available to aid others in also celebrating the event.

It was suggested that until the culmination of the Jubilee on Oct. 21 at the great demonstration to be given at Dearborn, Mich., it would be appropriate and feasible for many cities including those in foreign countries to put in a celebration in honor of Mr. Edison accompanied by spectacular lighting effects.

Certain it is that as a result of the meeting many celebrations will be staged in South American and Japanese cities. Among the foreign delegates in attendance at the luncheon meeting were: Shizuo Katoh, Pres. Inst. of Electrical and Mechanical Technology, Tokyo; Ryotaro Takai, E. E., Tokyo Electric Light Co. Ltd., Tokyo; Yasauemon Matsunaga, Pres. Toho Denryoku Kabushiki Kaisha, Tokyo; Jiro Honda, Guaranty Co., New York; Daijiro Ide, Tokyo Electric Power Co., Tokyo; H. A. Chapman, Toho Electric Power Co., Tokyo; Allan Maughan and S. B. Cox, Australia General Electric Co., Sydney; Mauro Herlitzka, Compania Anglo-Argentine, Buenos Aires; Mauro Herlitzka, Jr., Compania Anglo-Argentine, Buenos Aires; C. E. Dorion, Empresa Guatemalteca de Electridad; G. E. Sands, Compania Energia Electrica Rio Porto Alegre Rio Grande do sul, Brazil; Harvey Diamond, Compania Chilena de Electridad, Santiago; S. Masson, Usinas Electricas del Estado, Montevideo, Uraguay; W. A. Haile, Emprezas Electricas Brasileiras, S. A. Brazil; Dr. Marinbo de Azevedo, Brazil; Dr. Samuel Claro, Chile.

Barnes Gives American Viewpoint on Ownership of Business Enterprises

TO Julius H. Barnes, former president of the United States Chamber of Commerce, fell the lot of presenting, on July 12, before the International Chamber of Commerce, in session at Amsterdam, Holland, the American viewpoint concerning private and public ownership and operation of business enterprises. In the course of Mr. Barnes' address, which was followed with much interest, he said:

"In the field of public utilities for light and power service there is the same record of extraordinary efficiency in development and in administration. A vast interconnecting network reservoir of electric power, both coal-generated and hydro-generated, has resulted in distributing peak loads so economically as to reflect in lowered charges, rates being now lower than the pre-war basis.

"Governments may imitate the practices of private enterprise and here and there may occasionally register some advance, but in the great fields of transportation, communication and electric utilities the significant accomplishments are in overwhelming measure the product of private enterprise. These three monopolistic public services are regulated by public bodies protecting the public interest through continuous and flexible control of charges and practices, always subject to appeal through the established courts as high as the national Supreme Court itself.

"In the light of the enormous expansion of all industry resting on these three basic facilities and in the light of the steady rise in average living standards of all our people, there are few indeed in America who do not today realize that it is more important to have adequate and efficient service than it is to force an unwisely low level of charges that might check expansion and improvement. The policy of public regulation instead of public operation has justified itself a thousandfold in these services themselves, while the benefit of such services can be clearly indicated in the expansion and growth of all industry."

At the close of the discussion the congress, by resolution, declared that "private initiative and private operation of enterprise constitute the most effective instrument to assure the progress of industry and to increase general prosperity." To the formal resolution the American delegation added this comment:

"In increasing productivity, advancing living standards and developing the most widespread prosperity, the American delegation has been asked to outline the steps that have led to the most significant results of modern industry in American experience. We find it due to the following factors:

"1. Machinery aiding the worker and supplied by large capital ventures, making each worker more efficient.

"2. Increased wages and reasonable hours, increasing the value of that productivity by increasing the worker's buying power.

"3. Ownership of the industries in part by the workers by means of stock investments, giving the workers a financial interest in the prosperity of the company.

"4. Capital flowing in freely, unafraid of any possible government competition."

Thomas E. Murray

THOMAS E. MURRAY of New York died July 21 at his summer home in Southampton, L. I. By his death the electrical industry lost a distinguished inventor, to whom, it is said, more patents were granted than to any other man save Thomas A. Edison; an engineer of large achievement, and a light and power company executive who had much to do with the growth and success of the New York Edison Company and the United Electric Light & Power Company, its close ally.

As a builder of power plants also Mr. Murray had a record of unusual activity and accomplishment. His total installation of 2,168,380 kw. is probably larger than that of any other man in the industry.

Mr. Murray was born at Albany, N. Y., Oct. 21, 1860.

In 1898, after a successful record with public utilities in Albany, the late Anthony N. Brady brought Mr. Murray to New York to effect the physical merger of the electric lighting systems in Brooklyn, and shortly afterward Mr. Brady also intrusted to him the task of consolidating the electric lighting properties in Manhattan into the New York Edison Company, of which property Mr. Murray became second vice-president and general manager. He was senior vice-president at the time of the merger last year taking on the Brooklyn Edison Company, when he became vice-chairman of the board. He had also been president of the Yonkers Electric Light & Power Company and vice-president of the United Electric Light & Power Company. He founded the Metropolitan Engineering Company as well as the consulting engineering firm of Thomas E. Murray, Inc.

In the midst of these activities Mr. Murray found time to patent hundreds of inventions a large proportion being electric protective devices.

In his more recent years Mr. Murray gave considerable attention to electric welding and obtained a large number of patents covering his work in this field. Other devices covered by his patents cover such varied lines as steam boilers, the water-wall furnace for steam boilers, which has revolutionized boiler design; copper radiators, high-tension electric switches and fuses, electric protective devices, cinder-catching device for eliminating nuisance from stacks, automatic stoking device, pulverized-fuel equipment, refrigerating machines, reactance coils, concrete duct systems, electrically welded valves, fittings and pipe joints, coal hoppers, hydro-electric elevators, steel-plate flywheels, trench motor shells, axle housings and household appliances.

Mr. Murray for two years was president of the Association of Edison Illuminating Companies. Among the many honors he received were the honorary degrees of doctor of science, conferred on him by Villanova College, Pennsylvania, and doctor of laws by Brooklyn College. He was a member of the A.I.E.E. and other electrical and engineering associations.

Samuel M. Kennedy

SAMUEL MACAW KENNEDY, retired vice-president of the Southern California Edison Company in charge of business development and public relations, who gave up active work in 1927 because of ill health, died on Thursday morning, July 18, at his home in Alhambra, Cal. Funeral ceremonies were held at the Church of the Saviour, San Gabriel, on Saturday morning.

Mr. Kennedy was actively interested in the work of this association and served on a number of important committees. He achieved a national reputation because of his pioneer championship of the cause of good public relations.

Mr. Kennedy was born in Toronto, Canada, in 1863, and was educated in the Dominion. After some business experience in Europe, he became assistant to the president of the United Electric Power & Gas Company, Los Angeles, in 1900. This company was absorbed by the Southern California Edison Company in 1903, when Mr. Kennedy was made head of the commercial departments. In this post his original and progressive methods in commercial organization and business development not only contributed largely to the tremendous growth of the Southern California Edison, but also did much to stimulate the development and earning power of the electrical industry on the Pacific Coast. In 1920 he was made a vice-president of the company.

In addition to many contributions to the trade press on the subject of public relations he was the author of three publications written to serve this cause —"The Man in the Street," "Service" and "Winning the Public." The first two of these were in the form of essays and booklets. The third, published as a book in 1920, took rank at once, because of its comprehensive treatment of the subject and its direct and racy style, as a classic in its own line.

Mr. Kennedy had the misfortune to break his hip and arm as the result of a fall about three and a half years ago, and he never completely recovered from the accident. Besides his connection with the Southern California Edison Company, he had been vice-president of the Santa Barbara Suburban Railway and the Pacific Gasoline Company and a director of the Alhambra Savings and Commercial Bank. In addition to having been an active worker in the National Electric Light Association, he was a member of the A.I.E.E. and A.E.S.

William S. Andrews

AN APPRECIATION

WHEN a veritable martyr to science in the person of William Symes Andrews, consulting engineer of the General Electric Company, and an early assistant of Thomas A. Edison, passed away at his home, 1018 Park Avenue, Schenectady, N. Y., the afternoon of July 1, 1929, the world at large lost one it will be difficult to replace. Endeared as he was to scientists and technicians for his many contributions to theory and practice, he was equally endeared to all whose privilege it was to really know him, as a man of lovable character, sterling integrity, seeing the good, and only the good, in every situation with which he was confronted. Handicapped by many afflictions for several years and for many months confined to his bed because of these afflictions, all the direct result of his earlier efforts for the advancement of science, his constant thought was that of gratitude to God, and to those who ministered to his requirements, that his lot was not as bad as it might have been. To those familiar with his condition it would be difficult indeed for any but natures such as his to conceive reasons for gratitude, but Mr. Andrews saw them and never failed to express them. The superlative spartanism he exhibited throughout his illness, in fact throughout his entire life, will long remain a cherished memory.

Mr. Andrews contributions to the electrical industry, as well as to science in general, were numerous. He was one of the loyal band of workers who assisted Mr. Edison in the early electric light experiments at Menlo Park, N. J., as well as in the practical development of the electrical industry resulting therefrom. Had he lived until December next he would have celebrated his Golden Jubilee with the industry he did so much to perfect. That he did not is a loss to science, and to those priviledged to call him friend.—F. A. WARDLAW, *Secretary, Edison Pioneers.*

Service Suggestions
NATIONAL ELECTRIC LIGHT ASSOCIATION COMMERCIAL NATIONAL SECTION
CUSTOMER RELATIONS COMMITTEE
H. T. EAST, *Chairman*, Public Service Co. of Northern Illinois, Chicago, Ill.
To formulate efficient methods of conducting relations between the customer, the public and the supply company, including such matters as taking applications in the office, forms, order routing, inquiries, complaints, meter reading, collections and credits

No. 74 August, 1929

Bill Jones Idea

The Human Touch in the Relations of Utility to Customer

By G. I. VINCENT

Vice-President, The Syracuse Lighting Co., Inc.

THE sole aim of all the thought and effort devoted to our public and customer relations problems is the making of satisfied customers. Contented customers mean good-will and prosperity for the utility company. What will make a customer contented, or, in other words, what should the customer think in order that we can expect him to be contented?

Keeping in mind that we are not discussing the relatively few in our communities but the great body of our customers to whom we apply the generic term "The Man on the Street," can we not say that if he is to be our contented customer he would think somewhat along the following lines:

The Contented Customer

He would have confidence in the utility. He would expect to receive his service at a fair and reasonable cost. He would like to know that in his contact with the employes of the utility, whether it be personal, by telephone, or mail, he would be met with friendly courtesy. He would like, above all things, to know that when he required service in his household he could not only secure it when he wanted it but that the required work would be well and completely done.

We cannot ascertain through the Chamber of Commerce or the Rotary Club whether our customers have confidence in the utility. Someone has said that the wise utility manager could find out more what his customers think of his business by visiting in the local fire houses than from all the business organizations in his community put together. If the utility is to enjoy the real confidence of its great body of customers it must be developed largely along indirect lines.

Speaking generally, the customer is receiving his service at a reasonable cost. It is highly probable that more equitable forms of rate will in the course of time, if not immediately, develop a better attitude of the customers toward the utility.

What chance has the most courteous and carefully trained employee to make friends with a customer when he first must explain why, because of yards of red tape, the customer cannot receive his service when he wants it?

It is to this phase of customer relations that Syracuse has given much thought without at all losing sight of the other fundamentals. As should be quite clear, the belief prevailed that unless this were properly developed to the contentment of the customer, accomplishment along the other lines would be seriously handicapped. This belief led to the adoption of "The Syracuse Idea," sometimes referred to as "The Bill Jones Idea."

The idea is now six years old so again it will be clear that it was inaugurated at a time when the promptness and completeness of service of the average utility was not at all what it is in most of them today.

> **Success many times results from the adoption of a plan or an idea that has been satisfactorily worked out by some other concern in a similar business. Our electrical industry is young, and we can profit by injecting new ideas into our operating, public relations, accounting and commercial departments.**
>
> **"Service Suggestions" offer a method for accomplishing this.**
>
> **"Service Suggestions" have proved of great value to the executives, heads of departments, and employes who have carried out the ideas.**
>
> **I believe that "Service Suggestions" should be read regularly by all who have their company's interest at heart, and who are personally ambitious. Doing this is bound to produce the acquired successful result. J. E. DAVIDSON, *President, Nebraska Power Company, Omaha, Nebraska, Past President N. E. L. A.***

Speeding Service

About the time of starting the plan, or shortly after, there was broadcasted to the industry the statement that one of the large utilities had succeeded in speeding up their residential customer service to the point that the average elapsed time from the giving of the order until its completion was twelve working hours. A little arithmetic and the application of a little probability will indicate how many of the customers must have waited overnight for their service. When Syracuse started its then new idea it was doing at least this well.

The business of The Syracuse Lighting Co., Inc., is electric and gas service, together with the selling of coke and appliances. Industrial electric and gas promotion is also active and efficient. The population served is about 200,000.

The problems confronting the company were:

1. To speed up the residential service.
2. To combine the residential electric and gas service, because in the customer's mind there was no difference.
3. To create a more intimate human contact between the customers and the company.

The company was at that time following the usual practice of concentrating the order taking at the main office and all order for service, whether telephone, verbal, or written, were received at this point. For verbal orders trained employees were delegated to receive the various kinds of orders, that is, service orders at one point, trouble orders at another, discussion of accounts at another, duplicate bills at another, credit at another, and so on ad infinitum. Clever writers and speakers have pictured the customers' first day under this system and it is useless to repeat it.

After the order was received it was sifted through various checking and counter-checking departments and finally sent by a messenger either to the electric or gas department where it awaited its turn to be dispatched to the particular employee trained to do the particular kind of work. Looking back on it, it does seem ridiculous that a customer coming to the office for what was in his mind—one order—would have to make contact with three or four employees in the office and subsequently have three or four men at different times arrive at his home to execute the work.

But at that time such a system was the accepted one. Naturally, the plan could not stand unchallenged after real thought had been given to eliminating lost time, even though the orthodox method of order taking and executing was followed.

Is it not a reasonable statement that even the most ox-like mind would not be contented with such service for something that is no longer a luxury but a necessity in his household activities?

Essentials of the Plan

It is not necessary to review all the studies that were made extending over nearly a year before the new plan was definitely inaugurated, but in general it was decided:

1. That the verbal order taking for all kinds of service would be concentrated at one point in the office, all checking and searching eliminated and the order transmitted instantly to the proper department.
2. That all telephone orders should bypass the order taking department entirely.
3. To reorganize the order executing department, making the customer instead of the job the unit.

Discussing the last first, it was believed, in spite of much adverse opinion, that it would be entirely possible to train the right kind of personnel to do all kinds of residential customers' service. It was obvious that it would be necessary to equip this personnel with transportation and carefully designed tools and material stock so that any order could be executed. Regardless of a customer's ignorance of his requirements, what he really wanted could be done for him. It was also clear that changes would be required in the installation standards in order to fit in with the fundamental idea of instantaneous service.

Instead of operating the entire territory with a corps of specialists it was divided into districts, now twenty-five, and in each district was placed a man working out from headquarters and receiving most of his orders by telephone at intervals of one and one-half hours during the day. Light automotive equipment is used with the bodies designed to carry the necessary electric and gas meters and other stock which was found by careful study would be required.

Verbal orders received at the office are transmitted by telautograph to the operating department. The telautograph repeats in the credit department where the order is instantaneously checked for credit. It also repeats in the operating department which can start execution at once. Any questions as to credit are disposed of while the order-taking employee is still in contact with the customer.

Telephone orders for service go directly to the order executing department and are relayed out by telephone at the one and one-half hour intervals. The telephone order is the only application that is taken, as the only reason for the application is to secure the customer's full name correctly. If this cannot be understood over the telephone the service man is instructed to secure the application and determine the credit responsibility.

LIGHTING COMPANY
S.L.CO. 467
467

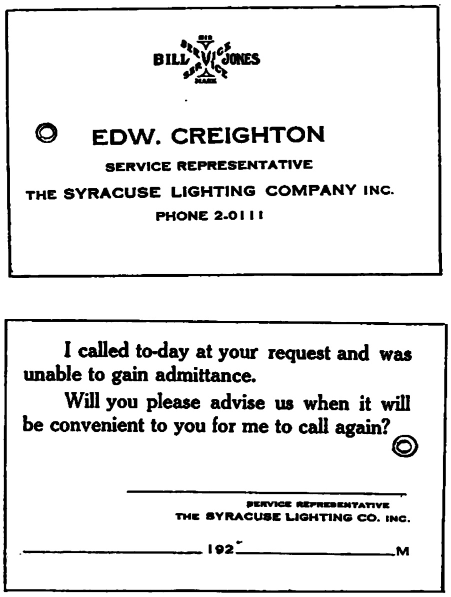
Two views of automotive equipment used in the district servicing work.

S.L.CO. 467
9 844

The service representative does work other than that called for by the order. For example, if his order calls for turning on gas and electric service he will adjust the gas appliances if necessary. He will deliver and put in fuses or instruct the customer how to install them. Anything else which needs attention or which the customer requests is taken care of. He is frequently stopped by customers who see him in the neighborhood and asked for service which is cheerfully given. During moving peaks a large percentage of the orders for turn-offs and turn-ons never appear at the office at all until after execution.

Only the high spots of this system, which, after six years, is functioning so smoothly that we hardly realize its existence, can be covered in this brief article. Three fair questions may be asked:

1. Have the customer relations been improved?
2. How much does it cost?
3. What do these high-speed all-service representatives do anyway?



EDW. CREIGHTON
SERVICE REPRESENTATIVE
THE SYRACUSE LIGHTING COMPANY INC.
PHONE 2-0111

I called to-day at your request and was unable to gain admittance.

Will you please advise us when it will be convenient to you for me to call again?

____
SERVICE REPRESENTATIVE
THE SYRACUSE LIGHTING CO. INC.

______________ 192______________M

Front and back of a card used by service representatives

The first question can be answered by asking another. If the average customer has come to know a pleasant, well-trained representative of the utility who renders service more promptly and completely than he receives even from the competitive businesses, will the customer not think more favorably of the utility?

As to our second inquiry, while more work is done for the customer, the transportation cost, which is one of the big items in modern utility customers' work, is obviously less than by the ordinary method. If a careful allocation of costs were made by superposing the standard method on the Syracuse idea it would be found that the standard method is the more expensive one.

There is an interesting development in the cost of this service in that the representatives are compensated through a good base wage plus participating premiums for quantity and efficiency. The group also gives much valuable aid to the sales department. When it became necessary to market coke produced by a new coal gas plant this group was used as a sales organization and marketed the entire output all to the domestic trade for which they were well compensated, but at a selling cost greatly below that of an average coke sales organization. Creation of a domestic market for a material like coke from nothing to over a million dollars' gross in slightly more than two years is an accomplishment which gives some conception of the value of this group as a selling agency.

What do they do? Well, among other things, these service representatives set, change, and remove meters and turn on and shut off service. They locate new electric service entrances and measure and collect for new gas services. They handle all kinds of appliance adjustment and other trouble orders. They deliver some merchandise and connect some gas appliances where only a few fittings are required. They are used to check up decreasing sales and do emergency work for the collection department. Inquiries as to high bills are investigated and disposed of. They develop sales prospects and do some selling when time permits. In fact, they do anything and everything for the residential and smaller commercial customers and also make emergency first calls on the large industrial customers. By a lap shift and a small night force, with Sunday and holiday shifts by turns, a complete service is available to our customers twenty-four hours a day every day in the year.

Why is the Syracuse system frequently called the "Bill Jones" idea? One time at a convention a man talked on utilities' customers service in its connection with public relations. He said that the little tiny utility whose manager, Bill Jones, was the whole works, never had any customer relations problem. Bill knew everybody in his little town by their first name and everybody knew Bill. His operations were hopelessly inefficient, but the self-serving demagogue would not have gotten a good start in his community. The speaker said that when, however, the little utility grew to huge size and marvelously improved efficiency, it lost its human touch and became a thing instead of a personal entity. A part of the Syracuse idea is to bring back this human touch in the relations of the utility to its customers. A special newspaper writer looking for a story about the time that the idea was being inaugurated dubbed the high-speed all-service representatives "Bill Jones." The name stuck. It was homely and probably undignified but folks seemed to like it.

Could the Syracuse idea be established in a much large utility? Undoubtedly it could, but the problem would be admittedly more difficult. The tieing in of a number of order taking and order executing departments presents an interesting but solvable problem. The greatest handicap would probably be found in breaking down departmental lines. The customers' all-service department must necessarily take over many departmental activities. It is essential that the chief executives must be thoroughly sold on the idea. These obstacles could be solved and overcome and the plan adopted for the betterment of service and upbuilding of customers' good will.

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420 LEXINGTON AVENUE NEW YORK, N. Y.

Electrical Research Statistics

August, 1929

Issued Monthly by Statistical Research Department of the National Electric Light Association, 420 Lexington Ave., New York, N. Y.

H. A. Snow, *Chairman, Statistics Committee, Accounting National Section*
Wm. M. Carpenter, *Economist*
H. S. Bennion, *Director of Engineering, N. E. L. A.*
Merle Rainey, *Statistician*

The National Electric Light Association, a voluntary organization of companies and individuals affiliated with or interested in the electric light and power industry, organized to advance the art and science of the production, distribution, and use of electrical energy for public service.

The Association maintains a Statistical Research organization which collects, interprets, and makes available basic statistical information on the electric light and power industry. The publications and services of this department are available to all those interested, on request.

Current Statistics of the Electric Light and Power Industry

(As of May 31, 1929)

The data here presented are for the total (100 per cent) electric light and power industry and are based on monthly reports received from some 400 companies, representing over 86 per cent of the industry.

	APRIL			MAY		
DURING MONTHS OF APRIL AND MAY	1929	1928	Per Cent Increase	1929	1928	Per Cent Increase
*Kw-hr. generated (net)	7,379,347,000	6,357,342,000	+16.1	7,597,585,000	6,645,113,000	+14.4
Add—energy imported from Canada and purchased from outside the Electric Light & Power Industry	181,533,000	186,407,000	– 2.6	183,322,000	190,193,000	– 3.7
Less—energy used in electric and other departments	206,000,000	224,000,000	– 8.0	197,000,000	215,000,000	– 9.1
Total energy for distribution (kw-hr.)	7,354,880,000	6,319,749,000	+16.3	7,583,907,000	6,620,306,000	+14.6
Sales of energy in kw-hr. for:						
Farm service (not involving irrigation)**	6,831,000	....	....	6,706,000	....	....
Farm service (involving irrigation)**	77,214,000	....	....	133,300,000	....	....
Domestic service	795,044,000	683,525,000	+16.3	739,267,000	612,415,000	+20.7
Commercial service:						
Small light and power	1,056,965,000	930,073,000	+13.6	1,047,733,000	863,776,000	+21.3
Large light and power	3,761,825,000	3,195,321,000	+17.7	3,909,260,000	3,367,235,000	+16.1
Railways and railroads (motive power)	438,250,000	442,545,000	– 1.0	438,700,000	427,890,000	+ 2.5
Other sales to ultimate consumers	161,796,000	152,285,000	+ 6.3	159,947,000	142,990,000	+11.9
Total sales to ultimate consumers (kw-hr.)	6,213,880,000	5,403,749,000	+15.0	6,294,907,000	5,414,306,000	+16.3
Total revenue	$168,137,000	$153,893,000	+ 9.3	$166,309,000	$149,029,000	+11.6
Revenues from sales for resales and miscellaneous (included above)	8,816,000	7,804,000	+12.9	9,726,000	7,892,000	
DURING THE TWELVE MONTHS ENDING	APRIL 30			MAY 31, 1929		
*Kw-hr. generated (net)	85,304,897,000	....	....	86,257,369,000	....	....
Add—imports from Canada and purchases from outside the Electric Light & Power Industry	2,233,066,000	....	....	2,226,195,000	....	....
Less—energy used in electric and other departments	2,594,000,000	....	....	2,576,000,000	....	....
Total energy for distribution	84,943,963,000	....	....	85,907,564,000	....	....
New generating capacity installed (kw.)	1,925,000	....	....	1,921,000	....	....
Number of new customers added:						
Farm customers	....	....	....	....	....	....
Domestic customers	1,186,900	....	....	1,183,000	....	....
Commercial customers	197,800	....	....	244,000	....	....
Others	1,500	....	....	1,000	....	....
Total customers added	1,386,200	....	....	1,428,000	....	....
Important factors:						
Percentage of energy generated by waterpower	38.7	....	....	38.6	....	....
*Average pounds of coal per kw-hr. generated	1.70	....	....	1.69	....	....
Domestic service (residential use):						
Average annual consumption per customer (kw-hr.)	472	....	....	476	....	....
Average revenue per kw-hr	6.44	....	....	6.40c.	....	....

---

*By courtesy of the U. S. Geological Survey with deductions for plants not considered electric light and power enterprises.

**As reported by 197 companies only, included in figures below.

Basic Information on the Electric Light and Power Industry
As of May 31, 1929

The data included in this table are basic factors of the electric light and power industry and will be brought up-to-date at the end of each month and published in each issue of the Bulletin.

1. Value of plant and equipment	$10,250,000,000
2. Total generating capacity in kw.	28,129,000*
Steam	20,145,000
Waterpower	7,688,000
Internal combustion	296,000
3. Total number of customers served	23,853,000
Farm customers (as reported by 190 companies only)†	(335,338)
Domestic customers	19,454,000
Commercial customers	4,346,000
4. Population in electrically lighted homes (Electrical World)	81,500,000**
5. Percentage of homes which are served with electricity	66**
6. Miles of transmission lines (11,000 volts and above) (circuit miles)	150,000**

*Subject to revision. **As of January 1. †Included below.

More Service at Lower Rates

According to a statement issued by the Statistical Research Department of the National Electric Light Association, reviewing the use of domestic electric service, Mr. Henry Ford's ideal of providing more and more electricity for less and less money as set forth in an interview appearing in the *Electrical World* of July 20, has been followed by the electric light and power industry ever since the war.

In 1918, following the lifting of restrictions on the use of electricity during the period of war emergency, the average household in the United States used 272 kilowatt-hours per year. Since that time the use of electric service by this same average household has been steadily increasing. In 1920 the figure stood at 339 kilowatt-hours; in 1922 at 359; in 1924 at 378; in 1926 at 404, and in 1928 it had risen to 459 kilowatt-hours, which represents an increase of nearly 70 per cent over the figure of ten years ago.

Taking the United States as a whole, the average price of residential electric service has steadily declined. From 8.3 cents per kilowatt-hour in 1918, it dropped to 7.5 cents in 1920 and then progressively to 6.55 cents in 1928, although the cost of living and of all items entering into the construction and operation of utility service have steadily increased during the same ten-year period.

It is within the past twelve months, however, that this provision of more service at lower rates has received an additional impetus. An examination of the quantities which have appeared each month at the bottom of the tables of monthly statistics shows that the average price of domestic service—again taking the United States as a whole—has shown a further decline. Arranged in tabular form, the figures for average use, average price and the consumer's average annual bill stand as follows:

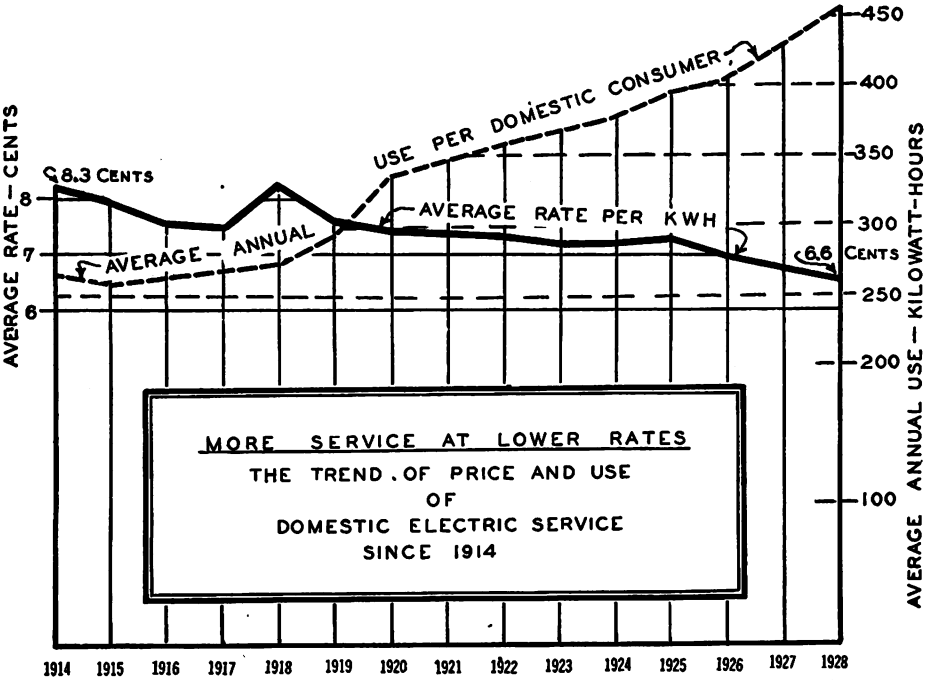
DOMESTIC ELECTRIC SERVICE

(For the United States as a Whole)

Twelve Months Ending:	*Average Use, Kw-hr.*	*Average Annual Bill*	*Average Price Paid per Kw-hr.*
Dec. 31, 1914	268	$22.25	8.3c.
Dec. 31, 1920	339	25.25	7.5
Dec. 31, 1922	359	26.50	7.4
Dec. 31, 1924	378	27.25	7.2
Dec. 31, 1926	404	28.26	7.0
Dec. 31, 1927	429	29.20	6.80
Dec. 31, 1928	459	30.10	6.55
* * *	* * *		
Feb. 28, 1929	463	30.28	6.54
Mar. 31, 1929	468	30.42	6.50
Apr. 30, 1929	472	30.40	6.44
May 31, 1929	476	30.46	6.40

During the recent Convention of the National Electric Light Association in Atlantic City, speaker after speaker stressed the importance of increasing the use of domestic electricity, this increase to be brought about by a reduction in price. Mr. Matthew S. Sloan, newly elected President of the Association, in an address entitled "Sales Increase or Rate Increase," said emphatically: "We must sell more kilowatt hours for each dollar of investment, making our equipment work harder and steadier and the place to sell more service, in my judgment, is in the home." Concluding his address he said: "It seems to me more than a coincidence that in every case I know of a reduction in domestic electric rates has been followed by increased use of service. There may be instances where this was not true, but they have not come to my attention. It was true in Brooklyn under conditions which covered a series of reductions over a period of several years. It has been true in up-State New York, in New England, in Middle West, and on the Pacific Coast. These companies which show the highest annual domestic sales also show the lowest rates. We have, therefore, in the experience of our industry, what may be accepted as a guiding principle in stimulation of sales service for domestic use. The way to increase such sales is to wisely and properly lower the domestic rates."

The attached chart shows year by year, since 1914 and up to Dec. 31, 1928, the increase in the average use per customer, coupled with the decrease in the average price.



National Electric Light Association Statistical Research Department

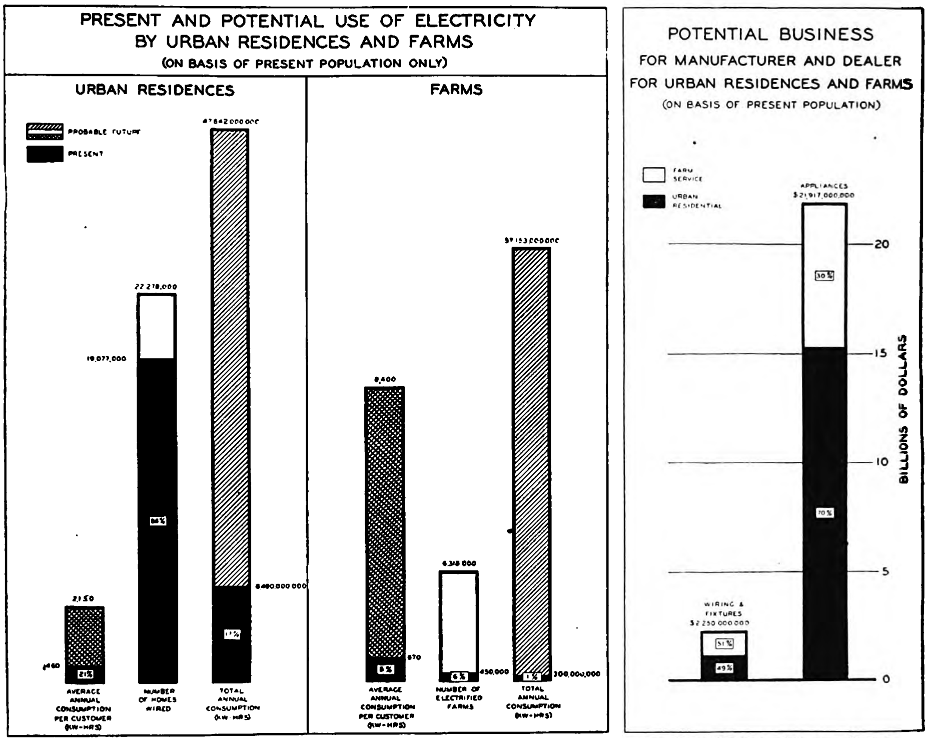
Potential Business Existing in Complete Electrification of Homes and Farms

NEARLY twenty-five billion dollars of potential business exists in wiring, fixtures and appliances for the manufacturer and dealer of electrical equipment in the complete electrification of homes and farms, according to the accompanying chart, recently exhibited at the Atlantic City Convention of the National Electric Light Association by the Statistical Committee.

At the present time, the average urban home takes only barely one-fifth of the amount of current which a fully electrified household can successfully use, while the average farm takes only one-twelfth of the electricity which agricultural surveys have demonstrated can profitably be put to work. In addition to this, there are still more than three million urban homes and nearly six million farms which at present have no electric service.

In order that the homes and farms of the United States may be able to use electric service to its greatest advantage, two and a quarter billion dollars worth of equipment is indicated in new wiring and fixtures, while a market of nearly twenty-two billion dollars is shown for appliances of all kinds ranging from heavy farm motors to flat irons and electric fans.

LOOKING INTO THE FUTURE



Statistics Committee, Accounting National Section N. E. L. A.

More Work from Less Coal

ACCORDING to a statement issued by the U. S. Bureau of Mines in its recent publication "Coal in 1927," "the production of fuel power has risen from 4,000,000,000 kilowatt-hours in 1902 to about 53,000,000,000 in 1928. The consumption of coal has increased during the same period, but in much smaller ratio. In 1902 the utilities used, in round numbers, 11,000,000 tons; in 1928 they used 41,300,000, an increase of less than 400 per cent against the 1300 per cent increase in power production."

In analyzing the conclusions outlined by these figures, the Statistical Research Department of the National Electric Light Association has grouped on the accompanying chart the trends in the consumption of fuel by the three largest users of coal in the United States; that is, electric power, iron and steel, and the railroads; as shown in the Bureau of Mines report. Everywhere that coal is used there has been a continued and progressive increase in thermal efficiency, as a result of expanding industry, larger units, and the cumulative results of twenty-five years of research and invention.

The iron and steel industry now produces the same amount of output with 32 per cent less fuel than it did in 1904, as the result of larger furnaces and better metallurgical and mechanical technology.

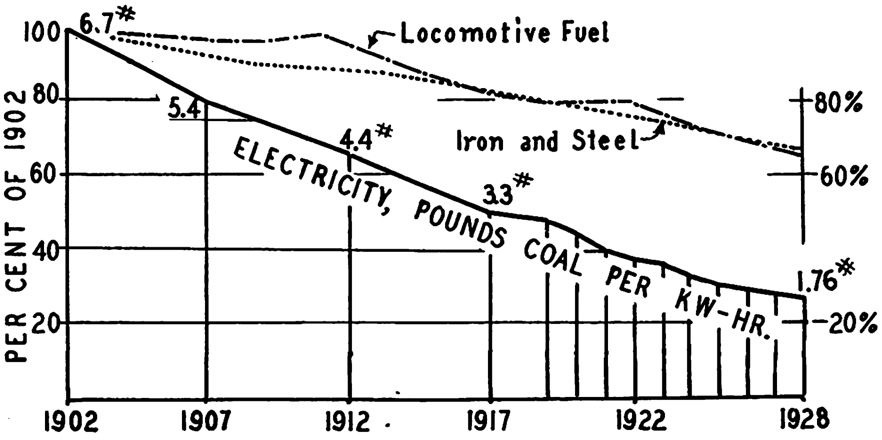
The railroads now obtain the same amount of work with 33 per cent less locomotive fuel than they did in 1904, reflecting the continued replacement of smaller and obsolete engines with larger and more powerful locomotives, the use of longer trains and higher speeds.

It is in the electric light and power industry, however, that the results of fuel economy have been most pronounced. In 1928 the same amount of energy was produced with 71 per cent less fuel than would have been required in 1904.

Great as these advances have been, there is still room for further improvement in bringing the average performance nearer to the level of what the best performance has already indicated as being possible.

INCREASING THE EFFICIENCY IN THE USE OF FUEL

SHOWING THE RELATIVE DECREASE IN THE AMOUNT OF COAL USED PER UNIT OF OUTPUT, BY THE RAILROADS, THE IRON AND STEEL INDUSTRY AND THE ELECTRIC LIGHT AND POWER PLANTS OF THE UNITED STATES.



(From "Coal in 1927" by the U. S. Bureau of Mines)

Statistical Research Department N. E. L. A.

ENGINEERING SECTION

Alex. D. Bailey, *Chairman*   **H. S. Bennion**, *Director of Engineering, N. E. L. A.*

Annual Reports of Engineering National Section Committees

Editor's Note: Herewith are printed summaries of the activities of several of the Committees of the Engineering National Section during the administrative year 1928-1929. This information, in previous years has been presented in the form of reports to the National Convention. It is now felt, however, that because of the nature of the reports, and the greater and more diversified circulation of the N. E. L. A. Bulletin, that the reports would prove of wider usefulness if published in this medium. Reports of other committees will appear in the next issue.

Report of the Power Systems Engineering Committee

L. W. W. Morrow, *Chairman*

THIS COMMITTEE was organized in Philadelphia on October 10, 1928. It held two other meetings during the administrative year—one at Cleveland on January 11th, and one in Memphis on March 11th.

During the year the committee concerned itself with the general problem of developing a guide for the coordination of the utility system as a whole. The work was confined to discussions covering different phases of the problem.

At Cleveland several utility executives outlined in detail the complete executive plan used in developing their respective systems. Properties presented were: The Detroit Edison Company, the Ohio Public Service Company, the Southeastern Power and Light Company and the Kansas Gas and Electric Company. As was to be expected, the older and more compact properties had developed system planning to the greatest extent, but all the executives accented the need for this work and pointed out its advantages and disadvantages.

Following this presentation, there was developed material on the engineering planning of systems at the Memphis meeting. The engineering reasoning back of individual system designs and the plans for meeting future needs were presented on the following properties: Brooklyn Edison Company, The Detroit Edison Company, The American Gas and Electric Company and the Oklahoma Gas and Electric Company. These transmission and metropolitan systems offered a splendid cross section of the variety of conditions encountered in system engineering planning.

The Memphis meeting showed it to be impossible at this time to go farther with the fundamental system plan as regards its engineering phases without some studies on separate aspects or problems. It is possible to make a skeleton outline of the fundamental plan, but the committee believes it will require some time to arrive at any detail statements for general use in the engineering assembly of systems.

For the next year the committee recommends a continuation of the work on the fundamental plan and, in addition, the appointment of subcommittees to deal with basic engineering problems now encountered. The present subcommittees have been held inactive except for the subcommittee on High Load Density Distribution. This subcommittee, under the direction of Mr. S. M. Dean, has completed a great deal of work.

Some of the basic engineering problems in the industry, to be dealt with by this or other committees, are listed as follows:

Basic Power System Engineering Problems

1. System stability under all conditions and fluctuations of load is desirable. Abnormal conditions are being investigated and apparatus and methods are being developed. High speed switching and excitation, current limiting devices in neutrals, and split winding generators and transformers are some recent developments to improve stability.

2. The design of circuit breakers and associated equipment for the interrupting capacities and voltages now encountered on power systems is still a problem of primary magnitude. Several new ideas in breakers have been presented and the entire breaker situation is in a state of flux.

3. Lightning and its effects on apparatus and service continues to be an unsolved problem. Much laboratory and field work has been done, but much remains to be done. The entire insulation of a system is in process of serious study.

4. Continuity of service is desirable to secure at a minimum cost. There is need for better selective relay schemes and for better layouts and plans to reach a goal of 100 per cent service. Automatic throwover switches have improved conditions, and the network principle has been used effectively in some cases.

5. It is desirable to fix the total spare generating capacity on a system on a better basis.

6. Methods to control the frequency, the watt and wattless energy on large systems are inadequate and must be improved. Tap changing transformers, synchronous condensers, series capacitors, pilot wire governor control and other developments are improving the situation.

7. Better voltage regulation is desirable in all parts of a system. The cost of good regulation is high, especially on the widely extended distribution lines.

8. System grounding continues to be a difficult problem with many variations in methods and practice. This problem has many ramifications, but is of great importance.

9. Now that preferred system voltages have been approved, it is desirable to go further and fix Y and Delta arrangements between preferred voltage systems, so that both phase relations and voltage magnitudes will permit parallel network and interconnected operations. This problem is associated with grounding.

Conclusion

The major ideas and premises of the committee were carried out this year. One object was the development of a perspective whereby a utility system would be viewed as a complete assembly that required an economic as well as an engineering knowledge to develop. A second object was to get adopted the idea that system growth should be planned and that a planning department was a necessary function in the utility business. These two ideas have been stressed to the exclusion of details, and the way is now cleared for an attack on those major engineering problems whose solution must be had before a fundamental system plan can be made. Interest in the work of the committee is great and all members contributed to the development of the committee program.

Report of the Prime Movers Committee

ÉDWIN B. RICKETTS, *Chairman*

IN the serial reports of the Prime Movers Committee for the administrative year the Committee has, as in the past, endeavored to reflect the progress in design and operation of steam power plant equipment. While it is impossible in this brief summary to give an adequate picture of the many important phases of the development which have taken place, it may be of interest to record here a few of the trends which these reports indicate.

There has been no material change during the past year in steam pressures and temperatures. While several new plants or extensions are under way to be operated at 1400 lbs., the bulk of the new installations are for pressures of 400 to 500 lbs., and it is indicated that relative values of these two pressures are mainly dependent on local conditions. The rise in steam temperature seems to have halted at about 750 deg. Fahr., pending the development of new alloys for higher temperature service.

The size of individual boiler units has kept pace with the increase in size of turbo-generators. Several boilers having a maximum capacity of 800,000 to 1,000,000 lbs. of steam per hour will be in service before the end of the year, each of these boilers will be capable of serving upwards of 80,000 kw. of turbine capacity. The almost universal use of water cooled furnaces, particularly in connection with pulverized fuel firing, has very largely decreased boiler outages. One large station so equipped has operated for the past eight months with a service demand availability factor of 100 per cent, this record indicates that we may yet build power plants with one boiler per turbine.

The present limit of individual stoker capacity seems to be about 500,000 lbs. of steam per hour; while there is no indication, however, that the limit of capacity for pulverized fuel furnaces is in sight.

An extensive survey of the operating records of both single and two pass condensers has been made. This survey indicates no decided advantage for either type, it being indicated that, on the average, heat transfer of about 80 per cent of the makers guarantees are realized under operating conditions.

The operating history of large turbines has been brought up to date.

A slightly improved record is shown, but the improvement is not sufficient to be significant. This operating history which has now been kept for a number of years is of particular importance because of the light it throws on the availability for service of increased primary capacity.

Report of the Inductive Coordination Committee

H. L. WILLS, *Chairman*

IN connection with the December meeting of this committee, one day was given to joint session with the Development and Research Subcommittee, with the view of bringing before the members of the Inductive Coordination Committee the problems which confront the Development and Research Subcommittee, and at the same time bringing to the attention of the members of the Inductive Coordination Committee the great amount of work that is under way and the large amount of detail which must be handled by each project subcommittee; and, further, that the work of each of these subcommittees must, of necessity, be coordinated with the work of one or more of the other project subcommittees. This move was deemed to be essential at this time by reason of the fact that there is a continual demand and a growing unrest among the members of the Committee in regard to lack of information and technical reports which they feel should be forthcoming from the development and research work.

Development and Research

While the Development and Research Project Committees are not in position to send out very many specific, detailed reports, it is true, nevertheless, that officials of member companies with the N. E. L. A. can obtain any information with regard to the work of the several project committees. Whenever they are interested to the extent that they will make a specific request for such information, this may be obtained through application to Headquarters; and once the knowledge that this is true is more generally recognized, there will probably be less pressure brought to bear on these project committees for rapid completion of their work, which, in general, would be very detrimental in the long run, by reason of the fact that the problems submitted to each subcommittee must be worked out to the last analysis, and the results of their work will thereafter stand as the fundamental basis upon which principles may be set down with the assurance that the principles so evolved will be subject to very little change in the years to come.

Current Cases

One of the important lines of work that has been carried on by the Inductive Coordination Committee is found in our so-called Current Cases work. During the year we have followed up nine specific cases where one or more members of the Current Cases subcommittee have been able to assist in reaching more or less satisfactory conclusions of differences in the field.

Radio

Our Radio subcommittee has been active throughout the year, keeping in close touch with developments at Washington, D. C., protecting, as far as possible, the interests of the industry in radio communication for use of the power companies. The one important thought in this connection lies in the fact that in so far as this subcommittee has knowledge of the situation, the member companies of the N. E. L. A. in general have not taken advantage of the opportunities which have been given to them to utilize radio communication to the extent that would justify the Federal Radio Commission in setting aside for our specific and undivided use certain frequency channels in the radio frequency spectrum.

Automatic Train Control

Our Automatic Train Control subcommittee has practically finished its active work, and is now being held together with the idea that they will watch the general development of train control so that they will be ready as an organized body to take up any questions which may arise in this field which are of interest to the electric light and power industry.

Educational

Our Educational subcommittee has completed its analysis of the general subject of education along inductive coordination lines, and submitted a report covering a topical outline of the subjects to be treated in this course, and showing the more important details which should be considered under each subject.

To prepare this course it was the opinion of the committee members that one or more thoroughly competent men should be secured to devote all of their time and talent to its preparation. Lack of funds to accomplish this has brought the work of this subcommittee to a standstill.

Carrier Current Communication Systems

Carrier current communication systems are being put into service on the transmission lines of power companies in a great many places. In the development of these several systems of carrier current by the different manufacturing companies, it has been found that cooperative consideration as between the several manufacturers and the telephone interests and ourselves was necessary to avoid inductive interference with telephone operation, and also to obtain such coordination between the several systems as would make it possible to interconnect one system of carrier communication with another system of carrier communication in the same territory. Our subcommittee has accomplished a large amount of effective work in this regard, and has secured a general recognition of the fact that for the power companies to secure the maximum benefit which this system of communication permits, it is necessary that all parties at interest should work together to secure the best possible coordination.

Report of the Overhead Systems Committee

HAROLD COLE, *Chairman*

THE following is a brief report of the accomplishments of the Overhead Systems Committee for the past year:

Loading and Strength of Overhead Lines

The research work on the strength of overhead lines, together with the collection of information on loading which may be expected in various localities, continues to be probably the most important activity of the Overhead Systems Committee. This work has been in progress for three years now under the Chairmanship of Mr. W. G. Kelley, and has advanced to the point where we may expect to obtain some tangible results in the near future.

The experimental line which was erected near Ann Arbor to study the effect of wind on aerial line structures has been subjected to a considerable number of wind storms throughout the past winter and a large amount of records have been secured which are now being tabulated and worked up in such a manner as to make it possible to readily interpret results. The data has been so far only on one size of wire (No. 6 A. W. G.) loaded with an equivalent of ½-inch of ice, on a weatherproof covered wire. This summer the wire will be changed to No. 0000, with an equivalent of ½-inch of ice on a bare conductor. It seems quite likely that another winter season will give a sufficient number of winds of high velocity to collect all of the data necessary to determine the effect of wind upon structures of the kind we have set up, namely, wood pole distribution lines. Whether the results obtained can be used to determine the effect upon longer span lines remains to be seen.

A start has also been made during the past year on a study of Wind Gusts and the contract with the University of Michigan was extended to include this study. Special anemometers are being developed for the recording of wind velocities, and it is the intention to obtain simultaneous readings of velocities along vertical and horizontal fronts, so as to be able to determine the extent of gusts of high velocity which occur at any one time, and in general give a more accurate idea of the way each wind acts. The work which has already been done on the experimental line indicates that there is a considerable variation in wind velocities at different points at the same instant. In connection with this wind gust study it is proposed to erect a 260-foot steel tower on the same site as the experimental line for the purpose of obtaining the vertical variation in wind velocities.

The work of collecting information on storms involving both wind and ice loads has been carried on this year with much more satisfactory results than in the past. The assistance of the Geographic Divisions in carrying on the collection of this information has been productive of very good results, and the cooperation of the Weather Bureau stations has been very helpful. A considerable mass of this storm data is now in the hands of headquarters staff, and if this can be carried on for several more years it should be possible to draw up some general conclusions which would be very valuable.

The headquarters staff has also collected a great deal of information on the strength of existing overhead line structures by sending field men to various sections of the country. This method of collecting data also has the advantage of securing uniformly interpreted results which might not obtain if different individuals submitted reports.

Insulator Research

At the beginning of the present year a Subcommittee on Insulator Research was appointed under the Chairmanship of Mr. H. C. Sutton, to study the matter of the deterioration of high voltage porcelain insulators. This Subcommittee has had numerous meetings throughout the year, has visited many of the insulator factories and has talked to the engineers of various insulator manufacturers and college professors who have been doing research work on insulators. As a result of their investigations they are recommending the initiation of a research project to study the behavior of high voltage suspension type insulators under conditions which would accelerate the deterioration of porcelain. Because of the fact that the Engineering Department of Tufts College has developed very accurate instruments for measuring the dielectric losses, they are recommending that this work be done at that institution. Their hope is to increase the information as to the aging of high voltage porcelain and to develop a means of testing high voltage insulators so as to determine just exactly how much its insulating value has deteriorated. At the present time it is only possible to determine whether the insulator is totally unfit for service.

National Electrical Safety Code

The Committee has continued to stir up as much interest as possible in the National Electrical Safety Code with a view to being better prepared for securing the best possible results in the next revision of the Code. The interest of the Geographic Divisions has been solicited in this matter and their cooperation has been, in general, very gratifying. Nearly all of the Divisions have designated one of their members to cooperate with the Subcommittee of the Overhead Systems Committee, under the Chairmanship of Mr. E. J. Amberg, which is carrying on this work.

It is also the intention of Mr. Amberg's committee to start immediately on a Code of Principles which should govern the safe construction of overhead lines in all situations, and it is hoped that when the revision of the National Electrical Safety Code is made, it will be possible to obtain a Code which is much more nearly a Code of Principles and not so much a detailed specification for construction of lines.

Marking and Lighting of Transmission Lines

A subcommittee was formed early in this year under the Chairmanship of Mr. O. H. Bundy, to study methods of marking and lighting transmission lines so as to be able to recommend the best means of doing this in case it becomes necessary for member companies to undertake this work. Considerable information has been collected on this subject and a report will be prepared in the near future which will indicate where the best information can be obtained on this subject. It is felt, however, that power companies will not be required to mark or light transmission line structures except where they are located in the vicinity of airports, and that, in general, the expense of such lighting should be borne by the Government and not by the power company.

Committee Reorganization

Reorganization of the Overhead Systems Committee was put into effect the first of this year, and as now organized the Committee has four major subcommittees, namely — Distribution Lines Subcommittee, Transmission Lines Subcommittee, Materials and Equipment Subcommittee and Safety Rules Subcommittee. Each of these major subcommittees has a number of subcommittees to investigate particular subjects coming under their scope. In addition to these, there are two special subcommittees on Loading and Strength of Overhead Lines and Railroad crossings. Another improvement in the organization was the establishment of an Executive Committee which has held five meetings during the year, has relieved the main Committee of a considerable amount of detail work and has promoted prompt action on the part of the main Committee on all important questions of policy.

Railroad Crossings

A special subcommittee was appointed on this subject under the chairmanship of Mr. J. C. Martin at the end of last year. Since that time the subcommittee has made contacts with the representatives of the American Railway Association, has had a joint meeting with a subcommittee of their organization, and has started the formulation of a set of principles governing the construction of wire crossings over railroads.

Other Activities

The program of the meetings for the past year was designed to emphasize certain important developments in the industry which concern overhead line construction. The following is a list of the subjects to which special attention was devoted:

Preservative Treatment of Wood Poles—A talk was given on this subject describing the new method of treatment developed by the Western Union Telegraph Company called the Zinc Meta-Arsenite Treatment, at the Philadelphia meeting. Another talk on the subject of preservative treatment of pine poles was given at the Memphis meeting.

Construction and Operation of High Voltage Lines—Three expressly prepared talks were presented on High Voltage Transmission Lines, one at the Philadelphia meeting describing the Construction and Operation of the 220 kv. Conowingo Line and two at the Memphis meeting describing the methods of construction used on two different lines in the Middle West.

Rural Lines—At the Pittsburgh meeting, five specially prepared papers were given describing the methods of construction and practices followed in connection with the construction and operation of rural electric service lines.

Highway Lighting—At the Pittsburgh meeting three prepared talks were presented on the subject of Highway Lighting, which also brought out the relation of highway lighting to rural electrification. Considerable interest was shown in this report on an apparently neglected source of revenue for central stations.

Radio Interference from High Voltage Insulators.—A general discussion of this problem, arranged in cooperation with the Inductive Coordination Committee, was arranged for the Philadelphia meeting, and the representatives of various insulator manufacturers were invited to be present.

Service Restoration—At the Memphis meeting a very interesting group of papers were presented describing the methods of service restoration used by various large operating companies. This will be made the subject of a serial report.

Lighting Surge Investigation—Mr. F. W. Peek, Jr., of the General Electric Company, gave a very valuable and instructive talk on the results of investigations by his Company, to the members of the Overhead Systems Committee and others attending the Memphis meeting.

Report of the Meter Committee

E. E. Hill, *Chairman*

DURING the administrative year, 1928-1929, the Meter Committee consisted of 45 members. The membership was composed, as usual, of subcommittee chairmen, members at large, and Geographic Division representatives.

Cooperation with Manufacturers.

The general activities of this subcommittee have resulted in the further improvement by manufacturers of the accuracy of watthour meters, particularly at overloads; the completion of the development of polyphase watthour meters with bottom connected terminal chambers; the improvement in the accuracy and insulation of instrument transformers; and the development of a 2½ ampere meter for use with instrument transformers, which will result in measurements of greater accuracy. The committee has also arranged for the standardization of nameplate voltage ratings of watthour meters.

Correspondence Course for Electrical Metermen

The manuscript for the Correspondence Course for Electrical Metermen was completed during the summer of 1928 and was transmitted to the Educational Committee. The Educational Committee has succeeded in having printed at this time, most of the manuscript and we are advised by them that 912 copies of the course have been sold as of May 1, 1929. Many utilities are planning to use the course in their educational work for the training of their metermen.

Short Courses for Electrical Metermen

Mr. E. A. LeFever, Chairman of the Educational and Publicity subcommittee, has been active in handling this matter, as reflected by the number of short courses given in the several Geographic Divisions.

In addition to the 25 courses mentioned under Geographic Division reports, two courses were given in the Middle Atlantic Division, where no Meter Committee exists. These two courses were given at the Johns Hopkins University and the Virginia Polytechnic Institute.

Handbook for Electrical Metermen

The sale of the Handbook for Electrical Metermen has been proceeding normally.

Contact with the Accident Prevention Committee

The Meter Committee has worked with the Accident Prevention Committee in the matter of accident prevention and has prepared a review of the work related to accident prevention which has been done by Meter Committees of the National Electric Light Association in the past. We have also considered with the Accident Prevention Committee the matter of improvement in rubber gloves.

Contact with Regulatory Bodies

The utilities in various States have been supplied with information which enabled them to prepare requests to the regulatory bodies for the extension of periodic test intervals.

Outdoor Metering

There has been considerable discussion recently regarding outdoor metering. At the Memphis meeting the following statement was adopted as expressing the opinion of the National Meter Committee on the subject of outdoor metering:

> "For many years meters have been installed outdoors in localities where climatic and operating conditions made it feasible and desirable. Outdoor metering has also been adopted in rural communities and other more or less inaccessible locations where meter reading is difficult.
>
> "Prior to the development of the temperature compensated meters such practice

was not recommended in localities having wide ranges of temperature, but, with the modern temperature compensated meters, outdoor metering is entirely practicable wherever local conditions may warrant it. Such condition would in general obtain as follows:

"a. Rural line extensions.

"b. Summer resorts and transiently occupied homes.

"c. Places difficult of access.

"d. All locations where climatic and operating conditions make it feasible and desirable.

"The extension of the practice of outdoor metering should be governed by the economics involved. The Meter Committee, N. E. L. A., recommends that all manufacturers of outdoor meters or metering equipment conform to uniform standards of construction developed with the cooperation of the National Meter Committee."

Test Facilities in Terminal Chambers of Meters

The matter of incorporating test facilities in the terminal chambers of meters was discussed at the Memphis meeting and again at the Swampscott meeting. At the latter meeting the following statement was adopted as expressing the opinion of the National Meter Committee on this subject:

"(a) The test facilities should be included in the meter terminal chamber and not provided by the use of an auxiliary device.

"(b) There is no objection, if necessary, to increasing the depth of the terminal chamber, but the width and height dimensions as standardized should not be changed.

"(c) Consideration should be given to the possibility of constructing the terminal chamber in such a manner that the meter could be fitted directly in a conduit line.

"(d) The sequence of connections at the meter chamber should not be changed.

"On motion by Mr. Wadsworth, seconded by Mr. Currier, it was agreed that the manufacturers through Mr. W. H. Pratt of the General Electric Company should be requested to consider the matter of the production of a watt-hour meter with test facilities in the terminal chamber.

"It is the belief of the Committee that joint consideration of the problem is the best method to pursue in order that the final product may meet the varying ideas of the manufacturers and the users."

Sequence of Meter and Service Apparatus Connection

The following resolution was adopted at the Swampscott meeting of the Meter Committee:

"RESOLVED: That it is the consensus of opinion of the National Meter Committee that the National Electrical Code should permit the following sequences of service connections:

"(a) Meter—Service Switch—Fuse

"(b) Meter—Fuse—Service Switch

"(c) Service Switch—Meter—Fuse; and further that the National Electrical Code should not necessarily require the physical location of the fuse in the combined service switch and meter equipment. And further, that the meter and service switch and fuses need not necessarily be installed as a unit."

Completed Reports

During the Committee Year 1928-1929, five (5) serial report and two (2) code test reports have been published as discussed below:

1. Serial report entitled "State Laws Relating to Theft of Electric Current," N.E.L.A. Pub. 289-7).

The purpose of this serial report is to satisfy frequent requests for information concerning State laws relative to the theft of electric current. This report was compiled by the General Counsel for the Association, at the suggestion of the Meter Committee, Engineering National Section, N. E. L. A. It comprises the text of current laws of the several States in the Union and the Distric of Columbia, together with pertinent comments from court and commission decisions in leading cases. Although the Committee's primary interest is in laws relating to theft of electric current, enactments and opinions concerning the theft of other public utility service have also been included.

2. Serial report entitled "Low Tension Metering Installations." (N. E. L. A. Pub. 289-39).

The purpose of this serial report is to present the modern trend of low tension metering installation practice. The report points out that the trend of modern installation practice is to provide metal inclosures for all service boxes and metering equipment between companies' mains and the load side of meters. This is generally accomplished by inclosing the service wires in metal conduit installed so as to eliminate condulets and pull boxes, and inclosing the main switch, fuses, meter terminals, test facilities and connections in metal boxes or cabinets.

3. Serial report entitled "Summary of Public Utility Rules and Regulations for Electricity Meters." (N.E.L.A Pub. 289-40).

The purpose of this report is to show clearly the similarities and dissimilarities in the service rules so far adopted by State Commissions in the various States in the Union and the District of Columbia. Such rules and regulations have been adopted in twenty-one States and the District of Columbia. It is believed that this report will fill the needs of individuals interested in meters, and company executives throughout the country in studying these rules and regulations with a view of ultimately eliminating all existing differences applying to the same subject. The ultimate aim of the Meter Committee is, of course, to see the rules in all States standardized.

4. Serial report entitled "New Developments in Electrical Measuring Devices." (N.E.L.A. Pub. 289-47).

The purpose of this report is to bring to the attention of those interested the results of a recent survey made by the Meter Committee. This Serial Report is particularly of interest because during the last year or two important changes have been made in the design of watt-hour meters to improve their operating characteristics, particularly as applies to sustained accuracy at high overloads. The report also includes recent developments in demand meters, totalizing meters, curve drawing instruments and other electrical measuring devices.

5. Serial report entitled "New Developments in Auxiliary Testing Equipment." (N.E.L.A. Pub. 289-57).

The purpose of this report is to bring to the attention of those interested the results of a recent survey made by the Meter Committee. Realizing that many utilities have developed and built for their own use, many pieces of apparatus which may be of interest and benefit to others, a special effort was made to collect such material for this Serial Report. In addition, auxiliary equipment recently developed and put on the market by the several manufacturers have been discussed in this report.

6. Code Test Reports.

The results of Code Tests made on recent type meters of two manufacturers were published in the form of mimeographed reports for distribution to the Meter Committee membership. This type of report is prepared in comparatively limited number, as it is of value to the metermen only, whereas Serial Reports find a wider circulation and use.

Proposed Reports

In addition, the three major subcommittees have submitted the following tentative reports for final consideration by the whole committee.

(1) A Study of Meter Record Systems for Future Dating of Tests.

It is the purpose of this report to describe systems followed by utilities of small, medium and large size (as measured by the number of meters in service) for issuing test cards in accordance with a schedule prescribed by the utilities themselves, or by a regulatory body.

(2) A Study of Two Rate Metering.

It is believed that the Committee should compile available information and technical data regarding metering schemes which can be applied where energy is sold to a single customer at two different rates. Energy sold for refrigeration and heating can probably be sold at rates different from those which have been established for lighting and power loads. One of the major problems in the application of such rates, is the problem of metering.

(3) Retest and Inspection of Electrician's Rubber Gloves.

This report has been prepared to acquaint those interested with the methods used in retesting and inspecting rubber gloves.

(4) Watthour Meter Lubrication.

A continued study has been made of watthour meter lubrication and the results of this study will be included in the report.

(5) Accident Prevention.

A report which covers the past activities of the Meter Committee toward the prevention of accidents, has been prepared. It is believed that the report is of value as it presents a review of the Committee's activities during the past decade or so, and will afford operating men an opportunity to determine whether or not they are taking all of the necessary precautions, outlined at various times, to insure the safe conduct of their work. This is not proposed as a Serial Report, but as a Mimeographed Report to be circulated among the membership of the Meter Committee.

(6) Maintenance of Maximum Demand Meters.

Technical information and operating procedures related to the maintenance of demand meters have been collected. Reports of this character are issued periodically and later form a basis for material to be included in the Handbook for Electrical Metermen.

(7) Meter Testing Methods Which Produce the Greatest Number of Tests Per Day Consistent with Accuracy.

Maintenance expense for watthour meters amounts to a considerable sum of money. The Committee has been able to reduce these expenses materially, through the efforts of individual companies. The excellent work done by member companies in improving watthour meter performance has led regulatory bodies in various States to extend the periodic test interval, at the request of individual utilities, and has resulted in this saving.

It is proposed in this report, to outline methods which may be pursued and result in an increase in the number of tests performed by each tester, without loss in accuracy.

(8) Meter Department Organization.

With the changing conditions in the industry, the scope of many meter departments has been expanded to include other work than the testing of watthour meters. In many localities the installation of meters can be most economically carried on by the meter department. Metermen are found particularly fitted to conduct other routine testing operations such as tests and maintenance of relays, station instruments and domestic appliances of all kinds. This is proposed as a Mimeographed Report to be circulated among the membership of the Meter Committee, and for such other demand that may develop.

(9) High Tension Meter Installations.

A survey has been made to determine the practices of various member companies as regards high tension metering installations. This report was prepared to present the result of this survey, and to make recommendations wherever possible, to standardize equipment and methods for metering energy furnished at 1100 volts or more. The subject has been divided, as regards voltage rating, into three main sections, namely, 1100 to 6600 volts, 6600 to 66,000 volts and above 66,000 volts.

It is proposed to publish two serial reports dealing with this general subject. The first, dealing only with the selection of equipment and installation practices, and the second to consider the methods of test and maintenance of high tension meters and metering equipment.

(10) Test Procedure on Customers' Premises for A-C Watthour Meters

This report includes a number of rules and test procedures to be followed by meter testers on customers' premises. The information presented may be of use to some of the smaller companies, or some of the large holding companies operating a number of small companies for which it is desired to devise uniform rules and test procedures. Much of the data presented in this report is printed elsewhere, but for the above indicated purposes it has been deemed advisable to present this material in one pamphlet. This is proposed as a Mimeographed Report for distribution among the membership of the Meter Committee and for such other demand that may develop when it becomes known that such a pamphlet is available.

Work of the Geographic Divisions

One of the outstanding features of the year is what appears to be a great improvement in the organization and ability to produce work of the Geographic Division Meter Committees. As is often the case, work which is tangible, and can be described in a report of this character, is not necessarily the most important work which has been done.

Canadian Division

The Meter Committee, under the chairmanship of Mr. E. R. Spence of the Southern Canada Power Co., was recognized in this division as a representative body, competent to give advice in the matter of making rules and regulations within the provisions of the Electricity Inspection Act.

Much of this committee's time was expended in this important work in connection with the proposed government regulations.

Another activity was the consideration of the standardization of mounting bases for instrument transformers.

Eastern Division

This committee has undertaken to collect information and facts relating to the advisability and practicability of outdoor metering for residence installations. Another subject studied was demand meter records.

In addition, two short courses for metermen were given in this division at Syracuse University and the Drexel Institute.

The East Central Division Meter Committee has been active in the development of an oil for use on watthour meter jewel bearings.

The redesign of current and particularly potential transformers having better ratio accuracies and smaller phase angles was considered by it. The increase in the insulation of instrument transformers and the perfection of several types of demand meters were also discussed.

It has also assisted in the development of a bushing type transformer, suitable for use with high capacity oil circuit breakers to measure energy of transmission lines. It is in favor of the use of pilot lamps on the potential circuits of watthour meters because such lamps are a direct indication of the continuity of the potential circuit.

It has also studied the use of condensers as a means of correcting the effect of potential transformer phase angles upon meter registration.

In addition it has assisted in the production of a satisfactory type of power-directional relay for use in interconnection metering, and the standardization of the dimensions of current transformers.

Great Lakes Division

One of the major actions of this committee, was the establishment of four schools for electrical metermen in universities located in four States: Wisconsin, Michigan, Illinois and Indiana.

The committee has by test and investigation, with the cooperation of professors from two of the universities, found a satisfactory answer to the moot question of the difference between series, polyphase and single element method of testing polyphase watthour meters. The facts gathered would indicate that there is no practical difference between these three methods of test, provided the tests are properly made and the results are intelligently compared.

Middle West Division

A survey of the "as found" accuracy of watthour meter tests, made by the various utilities in the section, has been completed and the data are being tabulated and will be made a part of the Middle West Engineering Section report.

The committee also made a detailed study of metering combined single and polyphase loads on one watthour meter. This work was satisfactorily completed.

In addition, two short courses for metermen were given under the auspices of this committee at the Iowa State College and the Kansas State Agricultural College.

New England Division

Four short meter courses were sponsored: one in Maine, one in Massachusetts, one in Connecticut, and one in Vermont.

North Central Division

This committee succeeded in establishing the first meter school in the State of South Dakota. The school was held in the South Dakota College. Another school was held at the University of Minnesota.

Northwest Division

Among the many problems dealt with by this divisional committee are the following:

1. Realizing that safety work in meter testing is a very important item, this division has made a survey through a well conceived questionnaire to revive and stimulate safety ideas. Groups of questions were asked dealing with safety from the standpoint of (1) resuscitation and first aid methods; (2) operating methods; and (3) installation of safety devices and equipment.
2. Another subject given considerable attention by this committee was the calibration and use of rotating standards. The problem was handled by means of a questionnaire and resulted in the collection of considerable data. One definite tendency in this division is the calibration of rotating standards in the meter laboratory by men particularly assigned to this task, rather than by meter testers who use the standards in the field.
3. The subject of metering Neon sign loads was also discussed in detail by this committee.
4. The subject of metering large loads where the kilowatt hours at different steps of demand are required was also considered by this committee.
5. The subject of service entrance and meter loop requirements was discussed with a view of studying the various code requirements applying to service entrance and meter loops in small rural and suburban districts.

Pacific Coast Division

Three short courses were given under the direction of the Meter Committee: two in California, and one in Arizona.

New developments were investigated. Special tests and investigations of methods of measuring dielectric losses and determining sludging in transformer oils, were made. The effect of different wave forms on the accuracy of watthour meters was studied and reports were made.

Meter statistics were investigated.

The division recommends that the Meter Committee give more attention to the study and discussion of other electrical measuring devices, not confining all its time to the consideration of watthour meters.

Rocky Mountain Division

The Meter Committee in this division sponsored two short courses for metermen at the University of Colorado and the New Mexico College of Agriculture and Mechanical Arts.

Southeastern Division

The subjects listed below indicate the scope of the committee's activities:

1. A study of special metering, including kv-a hours, line loss, remote totalizing of demand, and I^2R metering.
2. Determination of the accuracy with which uncompensated meters may be tested with compensated standards.
3. Investigation and determination of the desirability of two rate metering as applied to the Southeast.

In addition, three short courses for metermen were given under the auspices of this committee at the Alabama Polytechnic Institute, the University of Florida and the North Carolina State College.

Southwestern Division

The work of the committee was centered about a study of current practices of operating companies with respect to metering procedure. Problems under consideration are:

1. Organization of Electric Meter Departments
2. Kv-a Rate and Metering
3. Primary Metering Practices—Outdoor
4. Fusing of Potential Transformers
5. Meter Service Switches
6. Demand Meter Installations and Maintenance
7. Standardization of Meter and Relay Testing Equipment
8. Testing Current Transformers

Three meter schools, one in Arkansas, one in Oklahoma, and one in Texas, were conducted. The desirability of establishing schools in Louisiana and Mississippi is being investigated.

Metropolitan New York Section

The following subjects were studied through five subcommittees:

1. The 2.5 ampere meter designed for use with instrument transformers.
2. Multi-element type DSW totalizing watthour meters for obtaining on a single meter the consumption of several feeders or machines.
3. Outdoor metering transformer units.
4. Various kinds of auxiliary equipment.
5. Phase-angle characteristics of type KF and type NA current transformers.
6. Correspondence Course for Electrical Metermen.

In connection with item No. 5, the possibility of dispensing with phase-angle determination on these transformers was discussed.

Work for the 1929-1930 Meter Committee

The following subjects should be given careful consideration by the incoming Meter Committee:

1. The development of a meter with which is included the necessary test facilities. This may be developed to have the test facilities wholly in the terminal chamber; partly in the terminal chamber, and partly in the meter; or the terminal chamber may be arranged to be fitted directly in a conduit line.
2. The development of a current transformer insulated for use on circuits not exceeding 250 volts between conductors, or 125 volts to ground. Such a transformer should be designed as small in physical dimensions as feasible. To make this possible its capacity may be limited to the burden of a single watthour meter. The ratio error should be limited to 1 per cent, and its phase angle should not be greater than 15 minutes.
3. Frequently the scope of the Meter Committee's activity is questioned. This occurs not only in National Meter Committee meetings, but is evidently also a subject of much discussion in the Geographic Division Meter Committees. Your chairman's personal opinion in this matter is that the charter of the committee is flexible enough to permit undertaking any task relating to measurement of electrical quantities, the installation of meters and related devices and the design of such apparatus.

   It is believed that the committee should not hesitate to act on a problem fearing that it may be outside of the scope of the committee.
4. The committee should carefully study installation methods. We have passed beyond the stage of using exclusively the so-called "meter service entrance switch." There are being developed equipment for the installation of meters in groups, and these developments should be carefully followed.
5. The possibility of reducing the number of sizes of meters manufactured and carried in stock by the utilities, should be given careful consideration.
6. The committee should consider with the manufacturers, methods that will make more difficult the tampering with registers. The construction of the register pointer as an integral part of the driving shaft would, if feasible, be a step in the proper direction.
7. A study of the performance of multi-element meters should be undertaken.
8. The possibility of placing limitations on the range of adjustments for watthour meters should be discussed with the manufacturers.

Report of the Underground Systems Committee

J. W. SYLVESTER, *Chairman*

HEREWITH is presented a brief report of the activities of the Underground Systems Committee, Engineering National Section, N. E. L. A., for the administrative year, 1928-29.

The meetings, of which three were held, in October, 1928 in Philadelphia, in January, 1929 in Pittsburgh, and in March, 1929 in Memphis, were exceedingly interesting as evidenced by the large sustained attendance. This varied from 96 in Philadelphia to 60 in Memphis, an average of 74 for the six sessions of the meetings.

The reports of the standing subcommittees, prepared and distributed in advance of the meetings to stimulate discussion, have been abstracted and are given below:

Cable Sheath Damage and Protection.

The arc-proofing of cables in manholes has become a standard practice and while there is no general uniformity relative to the material used for this purpose, all of the companies are generally satisfied with results that they are securing from their present practices. The second part of the report was given up entirely to a description of sheath corrosion encountered in Philadelphia within the past two years on their single conductor 75kv. cable. While definite conclusions have not been reached, indications are that this condition has been produced by chemical reaction of the green concrete aggravated by a combination of sheath and stray railway currents. In view of the fact that similar kinds of corrosion have been found by other companies on cables in other kinds of ducts than concrete and that cement lined and stone ducts have been in extensive use for many years without corrosive effects on the lead cables, it is evident that the corrosion found in Philadelphia is not inherent in concrete ducts.

Conduit and Manhole Temperatures.

The report covers in a broad and thorough manner the calculation of cable ratings, the constants used in such calculation, the method and records used in checking operating temperatures and underground transformer vault ventilation.

Cable Installation.

This report touched on installation of long cable sections, aerial cable, buried cable, the protecting of cable risers, an outline of an economic underground distribution system and an insulated pothead support. The economic feature of the secondary distribution system described was accomplished by the use of rubber insulated, unleaded cable on open wiring in the manholes with the same type of secondary service cables. Successful installations of cable sections approximately 1000 ft. in length were described. The pulling stresses on these long lengths have not exceeded the limits that the cable manufacturers and the operating companies have determined by tests are injurious to the cable insulation.

A-C Networks.

This report covered compilation of answers to a questionnaire covering the operating practices and experiences of the companies which have installed a-c networks within the past few years. Special consideration was given in this report to the burning off of secondary faults. From the operating experiences of the companies replying to the questionnaire, little difficulty has been experienced in burning off faults on secondary systems where the mains were tied in solidly. Most of the companies are using single conductor cables on their secondary systems.

Cable Joint Design and Construction.

Among the most important points brought out were the trends, along the following lines, pertaining to high voltage joints:

1. A decided preference for varnished cambric tape.
2. Plastic compounds above 20,000 volts.
3. Electrostatic shielding.
4. Stepping of insulation instead of pencilling.

The other subjects dealt with in the report were standardization of copper connectors, insulating sleeve and sheath bonding, lightning protection and a new design of splices and terminals.

Impregnated Paper Insulated Cable Research.

An outline of the status, duties and activities of this subcommittee, which is attached to the Power Transmission and Distribution Committee, A. I. E. E., High Tension Cable Committee, A. E. I. C., and Underground Systems Committee, N. E. L. A., was presented to and approved by the Underground Systems Committee.

The report of this subcommittee gives an outline of the researches which are being sponsored by the subcommittee, as well as those which are being conducted by the member companies, by the manufacturers and by the Electrical Testing Laboratories.

This extensive activity on the part of the industry, seemingly confirmed by the operating results of the past few years, lead to the conclusion that progress in the art is being made.

Inspection and Testing of Cables.

The report indicated in general a continued trend in the direction of improvement: the percentage of deficiency continues to decrease; dielectric strength so far as short time puncture tests are a measure is little higher than last year; insulation resistance, power factor and ionization factor are distinctly improving. Research activities in this field are investigations of the "nature of cable deterioration which finally results in failure, the causes of such deterioration and the development of methods of telling beforehand whether or not cable is going to be satisfactory."

Cable Operation.

This report covers the cable operation experiences for the year 1928 and indicates a decided trend upward in the operation of cables, joints and potheads. The improvement is more pronounced in cables operating at 20 kv. and above. Cable failures due to internal causes during the first and second years of operation have decreased markedly. Over two-thirds of the causes of cable failures are external, probably half of which could be overcome by greater care upon the part of the operating companies. No failures occurred in oil-filled single conductor and three conductor cables. Single conductor cable shows the lowest rate of failure due to internal causes, followed by three conductor shielded and three conductor belted.

Conduit and Manhole Construction.

This report described a number of construction jobs of an unusual character which have been carried out successfully by members of the subcommittee.

Conduit was laid under a canal in one case and on a bridge structure constructed over a ravine, to be occupied later by a sewer and eventually filled in to form a boulevard, in another.

An unusually congested situation making a difficult problem for conduit installation in the vicinity of a substation was successfully solved.

A novel application of the use of "well points" for draining wet sub-surface soils during conduit and manhole construction was effectively accomplished.

The construction of transformer manholes, which must be built under exceedingly bad soil conditions and the methods adopted to reduce annoyance to the public and property owners during such construction, were described at length.

A "Standardization of Fittings for Manhole Equipment" Subcommittee was formed for the purpose as indicated in its title.

A new development in the line of

three conductor 33 kv. oil filled cable was presented by one of the manufacturers. This included not only the theoretical side of the question, but the construction problems in connection with a recent installation in Chicago, the purpose of which is to "determine whether some of the advantages of the 132 kv. oil-filled cable can be applied to three conductor cable" for ultimate use at 66,000 volts.

A well illustrated presentation of the tests made by the Commonwealth Edison Company on the expansion and contraction of cables in oblong and octagonal-shaped manholes was made and the conclusions reached from these tests indicated that the former type, where the conduits enter the manhole at diagonally opposite corners, is preferable to the latter.

Underground Systems Reference Book.

During the past year great progress has been made in the preparation of the manuscript of the Underground Systems Reference Book. It should be the last word on matters pertaining to design, construction, operation and maintenance of underground installations as the most prominent men in their respective fields have been voluntarily devoting their time to the preparation of this reference work.

Earth Temperatures.

A report supplementary to the report of the subcommittee on "Conduit and Manhole Temperatures" entitled "Earth Temperatures" was presented at the Memphis meeting. This report covers in a very thorough manner the results obtained by the various subcommittee members throughout the country. The effect of ground temperature on cable ratings will bear a very important part in studies of this nature. Various methods of measuring earth temperatures are discussed as well as relations between air and earth temperatures, the time lag which occurs between the two, and the results which may be expected from various elements influencing earth temperatures are set forth.

Noise Being Studied by Joint Committee on Development and Research

THE Dictionary says "noise" in acoustics is the confused sound obtained by a number of discordant vibrations. This definition does not very closely conform to the sound that is induced in a telephone circuit by a nearby power circuit and called "noise" as the induced noise consists of only fundamental sound and its harmonics. Such induced "noise" may cause interference with the transmission of speech over telephone circuits and for this reason has been included in the program of the Joint General Committee.

This work has been assigned to Project 4* and involves a study of the nature and the effects of the noise, while the other projects are concerned with causes and remedies. A knowledge of the nature of noise in telephones is essential to a complete study of causes, and remedial work can progress more intelligently when the effects of noise are known.

Analyses of the power line currents and voltages show that besides the fundamental frequency component which carries the bulk of the power, there are a multitude of harmonic components which are the ones that cause induced noise in paralleling telephone lines. Observations made on telephone lines with an analyzer indicate the amount of noise which is due to each frequency component of current induced in the telephone line. If these data are compared with the frequency analysis obtained on the paralleling power line, noise arising from frequency not due to this exposure will be indicated. The data will also give a quantitative relation between power line harmonic currents and the amount of noise each cause on the telephone line. The results of this work are not yet ready for presentation.

Noise exists in the telephone receiver because currents, induced somewhere on the line, flow to the termination and through the receiver. These currents are variable in character. They are usually produced by many sources along the line, some of which are steady while others exist intermittently. The resultant noise current is an exceedingly complex one, usually made up of frequency components from 60 to 3000 or 4000 cycles per second. The components are for the most part odd harmonics of 60 cycle fundamental, but even harmonics or harmonic components, not multiples, of 60 are not uncommon.

In order to study the nature of noise on open-wire toll circuits, a survey covering measurements on several hundred such circuits was made. Tests were conducted in the large toll center of New York, Chicago, St. Louis, Atlanta, Pittsburgh and Cincinnati, so that representative material might be obtained.

In this survey each line noise was analyzed into its frequency make-up and charts were prepared showing the magnitude of each component present in the noise. The charts gave a visual picture of what frequencies were contained in the composite noise and in what magnitudes the currents were present, but still were not reliable pictures of noise. The telephone receiver is discriminatory in the way it responds to currents of various frequencies, the maximum response occuring in the neighborhood of 1000 cycles. The various magnitudes of noise currents must then be weighed according to the receiver response before an accurate picture of the acoustic pressure output can be obtained. Furthermore, the human ear does not respond equally for the same pressure input at different frequencies. It requires a pressure about five times as great for the low pitched note of 128 cycles as for the note of 512 cycles, to give the same loudness sensation at ordinary noise volume. The acoustic pressure outputs of the receiver must then be weighted according to the response of the ear before the charts of noise currents can finally be translated into noise.

Several line noises representing various selected types were recorded phonographically. The use of these records in articulation tests is explained later in this article.

The noise which comes in on the line is not the only source of noise interference encountered when telephoning. The noise in the room in which the conversation is being held also makes understanding more difficult. Room noise which affects telephone reception is that which leaks around the receiver cap and enters the covered car, and that which is picked up by the telephone transmitter and is carried electrically around into the receiver. In the latter case the so-called "side tone" enters the ear as part of the received sound.

A survey was conducted to study the nature of room noise. Apparatus was designed which would "pick up" and indicate the magnitude of the room noise and also give a rough measurement of its frequency composition. Tests were made in 300 business and residence locations under summer and winter conditions. Measurements were made in towns of various sizes from the largest to the smallest at various times of day and evening. Residences varied from apartments on busy city streets to quiet homes in the suburbs. The business locations included various types of establishments which were grouped under the following four headings: stores—wholesale and retail, business offices, manufactories and public places. The relative number of measurements made in any one class of location depended upon the relative number of telephone calls known to be transmitted to or from such a class.

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*Of the Joint Subcommittee on Development and Research of the Bell Telephone System and the National Electric Light Association.

Room noises which were found to be representative of residential and business locations are being recorded phonographically and made available for further tests.

The work of Project 4 in the immediate future will be to conduct a series of articulation tests to aid in determining the degradation of telephone service caused by room and line noise. It is planned to set up in a large room, complete telephone circuits of the commercial type, over which testers will call a series of sentences. In each of these sentences one of the words will be replaced by a syllable which is different for each sentence. At the receiving end of the circuit several receivers will be provided to permit simultaneous listening by several persons who will be situated in a sound proof booth. Each of these observers will write down the word or syllable which he thinks he has heard. The per cent of the total observations made, which have been recorded correctly will be taken as the articulation of the circuit. Several thousand tests will be made before an attempt is made to give out a summary of the results. During these tests the noises selected to represent the various types of line noise, will be introduced into the telephone circuit by using an electrical pick-up with the phonograph records of the noise, the volume being controlled by a vacuum tube amplifier and proper attenuators. The selected typical room noises will similarly be "picked-up" electrically from the records, amplified and introduced into the listening booth through high quality loud speakers. By introducing only line noise or only room noise, or a combination of both, the relative importance of each can be determined. The various types of line and room noises can be listed in the order of their degrading effects so that it will be known which kinds of noises can be permitted and which, so far as practicable, should be eliminated. When the effects on articulation of various types of noises are known an effort will be made to relate these effects to the magnitude of the noise as given by various measuring devices. It is hoped that a device can be developed by which, with the aid of the articulation data, the effects on intelligibility of a noise can be approximated by a single measurement on the line.

These are some of the ways in which the articulation tests and the study of noise in general can be used in solving a part of the big problem, inductive coordination.

In connection with the wave-shape survey of Project 5* noise measurements have been made on telephone circuits which parallel power circuits. Such tests determine under actual operating conditions the effect of various power line wave-shape on telephone subscriber lines of the different types. The following operating telephone companies have cooperated with the project committee in this work:

New England Telephone & Telegraph Co
Southern New England Telephone Co.
New York Telephone Co.
Southern Bell Telephone Co.
Chesapeake and Potomac Telephone Co.
Illinois Bell Telephone Co.
Northwestern Bell Telephone Co.
Southwestern Bell Telephone Co.
New Jersey Bell Telephone Co.
Ohio Bell Telephone Co.
Michigan Bell Telephone Co.
Bell Telephone Company of Pennsylvania.

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*See page 446 of July 1929 issue of NELA BULLETIN.

GEOGRAPHIC DIVISIONS and STATE ASSOCIATIONS

Pacific Coast Convention

THE thirteenth annual convention of the Pacific Coast Electrical Association, was held at Del Monte, Cal., June 19-22 with an attendance of 585 delegates. A feature of the convention was the talking-motion picture "highlights" of the Atlantic City National Convention. Through this medium also President M. S. Sloan of the National Association, who was unable to attend the convention in person, delivered a message to the West Coast Association. Likewise Thomas A. Edison was heard speaking from his home, Sir Ernest Benn spoke from London on the superiority of private enterprise, and Dr. Irving Langmuir of the General Electric Co., delivered a lecture on atomic hydrogen.

President Sloan emphasized the necessity of central-station companies concentrating on the domestic market, pointing out that commercial men have not fully "sold" the American home on the benefits of electricity. Rate structures are not yet right and a real inducement rate is needed, he declared.

Vice-President J. F. Owens, who attended the convention in person, made an excellent address at the opening session on the theme of human values in business. He pointed out that great energy has been given to the material aspects of the light and power business in the past and that now the industry must devote its attention to its human aspects.

In his presidential address P. M. Downing stressed the necessity for greater efficiency in all departments in order that rates may still further be reduced and electric service may become more widely and extensively used.

At the one meeting of the Commercial Section Chairman J. F. Pollard gave a résumé of notable accomplishments by the section in the past year. They include a handbook for agricultural power salesmen which will be distributed throughout the country. The commercial organization of the Central Arizona Light & Power Co. and a group plan for selling three major appliances—range, water heater and refrigerator—were described by A. F. Moriarty.

A talk on the purpose of and plans for "Light's Golden Jubilee" was made by H. M. Crawford. In an address on "Psychological Merchandising," A. Edwin Fein said that electrical merchandising managers should take advantage of the fact that health and food preservation are foremost in the public mind to push the sale of electric ranges and refrigerators. Results of a careful study of Diesel engine operating costs and competition with central station service were presented by W. K. Chawner.

Chairman N. B. Hinson of the Engineering Section reported at length on its accomplishments. Two valuable papers, one on improvements in distribution practice by D. K. Blake and one on metal-clad switch gear by A. W. Copley, filled out an afternoon session.

Addresses and special features were included in general sessions Thursday, Friday and Saturday. Several skits and playlets held the attention of the audience.

At the concluding general meeting Saturday morning, Paul S. Clapp, managing director, N. E. L. A., declared that the industry is making real progress toward complete electrification of America. Interconnection has made possible an ample supply of low-priced dependable power for industry, but there is a need for more aggressive large-scale business development, he asserted.

"Light" found its way into three features of the general sessions, and throughout the convention light and lighting effects played a dominant rôle. A novel and spectacular effect was produced when the beautiful Del Monte Hotel grounds were lighted for the first time on the evening of the opening day by a radio beam from a flying airplane.

Officers elected for the ensuing year for the Pacific Coast Association were: President, E. B. Criddle, Southern Sierras Power Co.; first vice-president, A. M. Frost, San Joaquin Light & Power Corporation; second vice-president, A. B. Day, Los Angeles Gas & Electric Corporation.

Wisconsin Association Convention

A PROPOSED revolutionary change in wiring, which, it was said, will save people of this country in excess of $4,000,000 each year, was one of the most important matters discussed at the Electric Section convention of the Wisconsin Utilities Association held at Wausau, Wis., July 18 and 19. Edward Bennett, professor of electrical engineering at the University of Wisconsin, announced that he has developed a substitute for the present three-wire system of distribution, substituting the steel conduit itself for the grounded neutral wire. The first application of Professor Bennett's discovery will be made in the wiring system of the Mechanical Engineering Building at Madison.

Professor Bennett said that the great advantage of his proposed system is that the cost in conduit and wire will be approximately 20 per cent less than for the three-wire system. Reduction in labor costs, he said, will amount to approximately 15 per cent. Electrical loss will be substantially less than for the average building as now equipped, utilizing one copper wire to complete the circuit, but enclosing it in the steel conduit for mechanical protection.

The convention was held in conjunction with Wausau's "Light's Golden Jubilee" celebration. Special sound films of the N.E.L.A. convention and talking pictures of N.E.L.A. convention speakers were shown.

Tom C. Polk, executive secretary of the Great Lakes Division of the N.E.L.A., praised the state and national associations as being responsible for the fact that today the American people are "electrically minded."

Steps in the advance of rural electrification were described by E. R. Meacham of the Wisconsin Power & Light Company. The gradual but definite tendency toward general uniformity of the conditions under which farmers throughout the state may obtain service is most encouraging, he maintained. Farmers in Wisconsin are using about four times more electric service on the average than they used five years ago and are already employing electrical energy individually to a greater extent than the average city customer.

H. R. Huntley of the Wisconsin Telephone Company discussed some of the important factors which affect inductive coordination of power lines and telephone lines. His talk was accompanied by a demonstration which illustrated many of the points discussed, the apparatus used consisting of a miniature three-phase power line and a miniature telephone line.

E. H. Finkelnburg of the Mississippi Valley Public Service Company reported on radio interference and equipment to eliminate it; A. F. Frahm of the Northern States Power Company, retiring chairman of the section, discussed the radical utility measures now before the Wisconsin Senate; T. A. Brown of the Madison Gas & Electric Company reported for the underground system committee, and President G. W. Van Derzee of the Wisconsin Utilities Association defended proper publicity methods, saying that opposition to them came from men ignorant of what they were designed to teach.

A. L. Pond, as chairman of a special historical committee, reported that Henry Ford has definitely decided to reproduce the world's first commercial water-power plant, which was that installed at Appleton, Wis., in 1882, for permanent exhibition in the Ford Museum at Dearborn.

D. G. Evans of the Wisconsin Gas & Electric Company, Racine, who was vice-chairman of the section last year, was elected chairman. The new vice-chairman is E. J. Kallevang of the Wisconsin Power & Light Company, Madison.

Northwest Division Convention

WITH a registration of 750 delegates, the largest number in the history of Northwest conventions, the Northwest Electric Light & Power Association held its 22nd annual convention at Seattle, Wash., June 26-28.

Urging as one of the seven cardinal duties of the public utility industry a vigorous attack against the entry of government into private business, W. H. McGrath, vice-president, Puget Sound Power & Light Co., Seattle, stated, in the opening address of the convention, that government ownership was "constitutionally unsafe, politically unwise, economically unsound and competitively unfair." Franklin T. Griffith, president, Portland Electric Power Co., Portland, in his response, recommended a word of mouth campaign by every member of the industry to counteract unfair newspaper interpretations of the industry's acts, which represent the opinion of only a single man, the writer or editor. Pointing out that it is not the government itself which is interfering with business, but rather the demagogues who have won a place on the government payroll they must hold at any cost, R. M. Boykin, president of the association, in his annual address analyzed and pointed out some of the dangers of the Grange or District Power Bill, which will be voted on by the people of Washington in 1930.

Dr. Henry A. Burd, University of Washington, analyzed the public attitude toward the power companies, showing wherein this attitude is different than it is toward businesses which are not natural monopolies, and urged the intelligent application of sound advertising principles as one solution of bringing the public point of view into harmony with the industry's aims and purposes. Paul S. Clapp, managing director, N. E. L. A., stated the industry would be remiss in its duties to the public, to its investors and to itself if it did not continue to inform the public and to combat with full vigor the aggressions of government ownership advocates. The program of the first session concluded with talking-motion pictures showing the opening of the N. E. L. A. convention at Atlantic City, the address of President M. S. Sloan, greetings from Thomas A. Edison, and the discussion of privately vs. socially owned property by Sir Ernest Benn.

The second session, comprising parts of the accounting, commercial and engineering phases of the business, was featured by a talk by Prof. Karl E. Lieb, University of Washington, who made a plea for finding a measuring stick of efficient management other than the customary arithmetical average of earnings per kilowatt-hour. He declared that when such a measuring stick might be devised the public and the utility would both benefit from the increased efficiency which could then be effected. For the Commercial Section, Kenneth A. McIntyre, managing director, Society for Electrical Development, told how the society was organized to aid commercial development of all branches of the industry. The session concluded with the presentation of Insull Medals to Andrew J. Huling, Portland Electric Power Co., and L. E. Banks, Mountain States Power Co., and a first aid demonstration by the girls' team of the Portland Electric Power Co.

In reviewing the work of the Public Relations Section at the third session, W. H. Ude, The Washington Water Power Co., Spokane, pointed to the conduct of public speaking and essay contests as the principal features. Finals in two public speaking contests on "The Public Utility a Good Citizen," and "How Can I Best Serve Our Customers," formed an important part of the program, as did the presentation of prizes in the essay contest on "Pleasing Mr. and Mrs. Public." Norwood W. Brockett, director of public relations, Puget Sound Power & Light Co., credited the industry with laying before the public too much emphasis on the public relations problem with the result that the public has become suspicious of the industry's public relations activities. A playlet entitled "Front Page News," presented through the courtesy of the Pacific Coast Electrical Association, proved to be one of the outstanding features of this session. George E. Erb, former chairman of the Idaho Public Utilities Commission, Lewiston, Idaho, discussed maintaining amicable relations with the public. Closing the session in masterful fashion, J. F. Owens, vice-president, N. E. L. A., drew attention to the human values involved in the public contacts of the thousands of utility employees, and declared that the fine integrity, honesty and sincerity of these employees was the best safeguard of the future of the industry.

Boat Trip

The closing feature of the convention was an all day boat trip to Victoria, B. C., where the British Columbia Electric Railway Co., Ltd., acted as host to the delegates. The final session was held on the boat in which D. W. Proebstel, Portland Electric Power Co., Portland, chairman of the Engineering Section, reviewed the accomplishments of the Section, and D. K. Blake, General Electric Co., Schenectady, discussed the economics of distribution. A. Edwin Fein, New York City, also spoke on "Psychological Merchandising."

Officers elected for the ensuing year include: M. L. Hibbard, vice-president and general manager, Idaho Power Co., Boise, president, and M. W. Birkett, vice-president and general manager, The Washington Water Power Co., Spokane, vice-president. A. C. McMicken, general sales manager, Portland Electric Power Co., Portland, was elected to honorary membership in recognition of twenty-one years of active service to the association.

Michigan Association Convention

By WAYNE F. McMEANS

ALL agencies interested have been hard at work in Michigan solving the many problems surrounding real farm electrification. As a result of their combined activities, 10,000 farms in the State will receive electric service this year for the first time, and 1500 miles of lines will be built to serve them, leaders in this development asserted at the annual convention of the Michigan Electric Light Association, held at Mackinac Island, July 1 to 3. This year's growth in farm service will exceed the combined progress of the twenty preceding years.

Of immediate importance in making this expansion possible, questions of rates and cost of line construction were solved by several companies. The Detroit Edison Co. always has had in effect its standard city rate for farm service customers, and Consumers Power Co. recently adopted a like policy. No one pretends that, under present conditions, such rates show a profit. "The utilities of Michigan," Prof. H. J. Gallagher of Michigan State College told the convention, "have a broader perspective than the immediate dollar return on farm service investment, and through their willingness and desire to serve agriculture on a basis within the earning scope of the farmer will do more toward establishing a balance in agriculture than would any farm relief bill passed by Congress."

Matter of cost of rural extensions was carefully investigated, and while methods reported at the convention differed somewhat, two types of dependable rural line have been developed which are being built at a cost of $1,000 a mile. To reduce the cost to this amount, Fred W. Bagnall said, The Detroit Edison Co. employed steel cored, bare aluminum wire, 35 foot poles, machine hole diggers. Spans of 300 feet were obtained. To avoid tree trimming and future moving of poles for highway widening, the company now places poles well behind the tree line on private property, obtaining this permission before the line is built. Hi-Tenso BB wire, 30 foot poles, with spans of 250 feet, are being used by Consumers Power Co., according to F. W. Pollock of Stevens & Wood, Inc.

Twenty thousand farmers have been in actual contact with electric power equipment for farm use at demonstrations held at State College, demonstration farms, and the demonstration truck of the college, Professor Gallagher stated in his address. A change of attitude of the farmers toward farm electrification is noted by him. "This year they came, not with a suspicious attitude against the utilities and a derisive attitude against rural electrification, but with a clamoring for information as to the right practices to pursue."

Walter R. Carven, chairman of the local committee of farmers on the Mason-Dansville test line, presented graphically the difference farming with electricity has made.

"The enthusiasm with which the farmer is seeking electricity is not a passing fad," said Mr. Carven. "He wants it because he knows what it can do for him, and he will be found constantly adding new installations which will save him time and labor, leaving such time and labor for recreation or added production."

L. C. Moore, holder of the farm electrification fellowship at State College, told of research work to develop electric hay hoists, electric brooders, automatic chicken feeders and poultry house cleaners, and electric ventilation in poultry houses and barns.

Feasibility of off-peak electric water heaters was discussed by R. R. Clark, Consumers Power Co. The company is now conducting tests on two Swiss heaters of this type equipped with time switches, and although the heaters have been in service only a short time, Mr. Clark professed a belief that such hot water service would be useful to customers and profitable to the utility at a rate of one cent a kilowatt-hour.

E. M. Burd Stevens & Wood, Inc., presenting a paper on "Comparative Costs of Generating Electricity by Steam and Water Power," said that the local mill power project or other small water power rarely can be worked into the present day power system. The cost of developing a small power and tying it in with the up-to-date utility transmission system, is about the same for the creek that supplied the old grist mill as for a river ten times its size and yield in energy. Other papers given were: "Outdoor Meter Installations," by J. C. Langdell, Consumers Power Co., with discussions by W. A. Wadsworth, vice-president and general manager of Michigan Public Service Co., and A. S. Albright, The Detroit Edison Co.; "Building of Electric Power Lines and Trimming Trees Along State Highways," by Phelps Vogelsang, forester, State Highway Department; report of Women's Committee by Miss Skulda Baner, chairman.

President Pett, in his address, said that in recent criticisms of electric industry "the outstanding facts about our industry are lost sight of—namely, that in each year since 1890, with the exception of the war period, the average price for electricity for home use has decreased. With practically no exception, the attitude of Michigan newspapers is eminently fair toward public utilities," he said, "and member companies are enjoying the confidence of the communities they serve." Mr. Pett quoted figures showing that Michigan companies quite generally have adopted the inducement type of rates, encouraging greater use of energy for cooking, refrigeration and appliance uses in the home.

At a joint session with members of the Michigan Gas Association, W. J. Hagenah, vice-president of Byllesby Engineering & Management Corporation, spoke upon "Public Utility Regulation and Its Accomplishments." At no time, he said, have State regulatory commissions permitted rates yielding an unreasonable return on the fair value; and that the savings which have been effected in the cost of producing and distributing electrical energy have been transmitted to the public through the constant downward revision of rates.

Mrs. Siegel W. Judd, Grand Rapids, president of the Michigan League of Women Voters, in her address, said that increasing consideration of domestic rates and the extension of domestic use of power on the part of utility leaders was most encouraging. A. C. Marshall, chairman of the Michigan Committee on Public Utility Information, and vice-president and general manager of The Detroit Edison Co., declared that the Public Utility Information Bureau has acted, since its founding, as a central source of information on facts concerning gas and electric utilities, had disseminated such facts in legitimate and ethical ways, and that the bureau would be continued with the same policies with which it was started. A definite need for such information exists, he said, and the bureau is the best means for filling it. Arthur W. Stace, director of the committee, spoke on "Public Relations and Public Opinion."

Officers elected for the coming year are: President, E. L. Edwards, Lapeer, vice-president and general manager, Michigan Electric Power Co.; first vice-president, D. W. Hayes, Port Huron, district agent, The Detroit Edison Co.; second vice-president, D. E. Karn, Kalamazoo, district manager, Consumers Power Co.; secretary treasurer, Herbert Silvester, Ann Arbor, district agent, The Detroit Edison Co. Directors: Howard Pett, Jackson, district manager, Consumers Power Co.; G. W. Baldwin, Sault Ste. Marie, Edison Sault Electric Co.; R. Evans, Frankfort, secretary, Lower Peninsula Power Co.; H. W. Riley, Buchanan, manager, Indiana & Michigan Electric Co.; and D. E. Byerley, Adrian, vice-president and general manager, The Citizens Light & Power Co.

New Officers for Indiana Association

AT a meeting of the Board of Governors of the Indiana Public Utilities Association, held in Indianapolis, July 18, H. S. Morse, general manager of the Indianapolis Water Company, was elected president for the ensuing year. Thomas F. English, general manager of the Indiana & Michigan Electric Company, South Bend, was elected vice-president.

The members of the Board of Governors of the Indiana Public Utilities Association for the current year are: C. L. Kirk, vice-president and general manager of the Citizens' Gas Company, Indianapolis; F. J. Haas, vice-president of the Southern Indiana Gas & Electric Company, Evansville; C. H. Rottger, president of the Indiana Bell Telephone Company, Indianapolis; F. E. Bohn, president of the Home Telephone & Telegraph Company, Ft. Wayne; R. M. Feustel, president of the Indiana Electric Corporation, Ft. Wayne; A. W. Brady, receiver of the Union Traction Company of Indiana, Anderson; W. H. Durbin, general manager of the Terre Haute Water Works Corporation; N. A. Perry, president of the Indianapolis Power & Light Company, and Mr. Morse and Mr. English.

Empire State Association Meets in September

THE twenty-fifth annual meeting of the Empire State Gas & Electric Association will be held at Saranac Inn, Upper Saranac, N. Y., on September 19 and 20.

It is expected that over two hundred executives and department heads will attend the two-day session.

A fine program has been arranged for the two morning business sessions, each Section of the Association being represented by prominent speakers who will discuss problems in all departments of the business including electrical engineering, gas engineering, gas and electric commercial practices, women's activities, accident prevention, accounting and electric meter engineering.

A program of entertainment and recreation has also been arranged, consisting of a golf tournament for the men and women, boat rides, auto rides, with a banquet and president's reception on Thursday evening.

Power Survey for Middle West Division of N. E. L. A.

PROF. V. L. HOLLISTER of the University of Nebraska engineering faculty has been engaged by the Middle West Division of the National Electric Light Association to supervise a power survey that a committee has been working for weeks to outline. The survey will cover all power plants in the four States composing the division — Iowa, Kansas, Nebraska and Missouri — and the results will be published in loose-leaf form so that in the years following the data can be kept up to date.

The plans have been materially changed from the first announcement, but the general purpose will be so to record the electric properties in the district that all member companies can get a picture of them in their entirety and in detail. Its principal value will be to enable a company to know the possibilities of interconnection in its vicinity. If it needs more power, the data at hand will help materially in solving the problem of whether it can get energy more cheaply through interconnection than by generation. In addition to a directory of each town, the capacity output at peak load, the transmission-line capacity and the interconnecting points will be set down.

Thorne A. Browne, secretary for the division, who has assisted in the work, says that while other divisions have taken surveys, an entirely new idea is contained in this one which will give each operator complete facts from which he can draw his own conclusions and build his own plans. The data will be supplied by the companies. C. L. Kaar, Wichita, Kansas, Gas & Electric Company, represents Kansas and is chairman; G. O. Brown, Kansas City Power & Light Company, Missouri; F. A. Beatty, Des Moines Electric Light Company, Iowa; F. E. Smith, Nebraska Power Company, Nebraska, with A. E. Bettis, Kansas City Power & Light Company, an ex-officio member.

Future conventions and meetings of electrical and allied associations are listed on page 536

WOMEN'S COMMITTEE

MISS SARA HARRIS, *Chairman* MISS ISABELL DAVIE, *Secretary*

News Letter

By MRS. THELMA VAN NESS

Publicity Chairman

ANNOUNCEMENT has been made by Mr. Harry Reid, Chairman, Public Relations Section, of the appointment of Miss Sara Harris, Utica Gas & Electric Company, Utica, New York, as Chairman of the Women's Committee.

MISS HARRIS

Miss Harris has been with the Utica Gas & Electric Company in various capacities for a number of years, and now holds the position of Assistant Secretary of the Company. She is the only woman officer the Utica company has ever had.

Miss Harris has been active in Women's Committee work for five years. She served as Chairman of the Women's Section, Empire State Gas and Electric Association for two years; 1925 and 1926. She has been a member-at-large of the National Public Speaking Committee for two years and a member-at-large of the National Women's Committee for one year.

* * *

The Women's Committee of the Illinois Power Company at Springfield recently held a reception and open house. A large number of visitors responded to the invitations extended to the women of the city. Refreshments prepared during demonstrations of appliances were served to about two hundred people. A souvenir in the form of a recipe book containing the recipes of the refreshments served was given to each guest. The committee in charge of this affair consisted of Miss Edna Heermans, Chairman, Misses Margaret Troesch, Rose Frey, Sophia Rudin, Edna Wirth, Carrie Funk, Irene Ryan and Bertha Millard.

* * *

Miss Helen Bennett, Chicago, managing head of the Women's World Fair and first director of the Collegiate Bureau of Occupation for women was the speaker at the May luncheon meeting of the Hammond, Indiana Women's Committee of the Northern Indiana Public Service Company. Miss Grace A. Leslie, chairman of the committee, presided. Men employees of the district and officers of several Hammond Women's Clubs were guests at the meeting.

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According to information in "The Wocompap," the Women's Committee of the Lake Superior District Power Company, through Mrs. Kevern and Miss Skulda Baner, assisted the Merchandising Department in putting on a cooking school at Hurley, Wis., before the Women's Club. There were about fifty people present. Miss Baner spoke on "The New Servant—Electricity." Mrs. Kevern assisted Miss Lerschen in the food demonstration.

* * *

The June meeting of the Illinois Northern Utilities Company Women's Committee at Dixon was devoted to safety and as the first number on the program, roll call was responded to by each girl giving a current event pertaining to safety. A series of papers on "Safety Practices in the Home" were given by Misses Opal Mossholder, Ingaletta Robertson and Mary Lou Downing, respectively. Mr. F. E. Crawford talked on the company's safety program, Miss Marjorie Bennett gave a very instructive talk and demonstration on first aid and the program was closed with a demonstration of the Prone Pressure Method of Resuscitation given by Misses Maryan Gonnerman and Leona Underwood. Miss Marie Lesage is chairman and Miss Helen Meeks is the secretary of this group.

The Women's Committee of the Huron (South Dakota) District, Northwestern Public Service Company, put on an electric range demonstration at their last meeting when the girls prepared dinner for twenty-six. A short program was enjoyed following the dinner. Several visitors from Mitchell attended the meeting.

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Puget Sound Power & Light Company's Northern District Women's Committee, Bellingham, Washington, recently put on the playlet "Wanted, A Stenographer" at the annual birthday banquet of the Bellingham Business and Professional Women's Club. Some very eminent women of the State in club work were on the program as speakers and the banquet was quite a club event. There were about fifty-five persons in attendance.

* * *

The Seattle Women's Committee has developed its Glee Club into a "Song and Dance Act." The company has provided costumes. Instruction is being given the girls in the dancing work. This act has been given at a number of service clubs in the city in connection with publicity programs being put on by the company and has made a decided hit. Other acts are being worked out and it is expected to continue to feature this group of about ten members.

* * *

The Women's Committee of the Eastern Oregon Light & Power Company recently served hot waffles and cake at a meeting of the Wingville Grange, which was held about ten miles from Baker, Oregon. Four waffle irons were kept busy until everyone was served. A committee of five girls prepared and served the food and the Grange women complimented the girls upon the efficient manner in which the lunch was served.

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The New England Division Women's Committee reports that Miss Elizabeth Ballantyne, secretary to Mr. W. S. Wyman, president of the Central Main Power Company, has been made president of the Augusta Business and Professional Women's Club. Miss Audrey Hanks, of the same company, was elected secretary. Miss Ballantyne attended the National Convention of this organization at Mackinac Island, Michigan.

Recently the women of the town of Winthrop, Maine, held a Better Homes Meeting. Seven women from the Central Maine Power Company, Augusta, served refreshments cooked on the grill, waffle iron and percolator. A representative from Landers, Frary & Clark demonstrated the electric range.

Following the installation of electric

ranges in an apartment house in Portland, Maine, by the Cumberland County Power & Light Company, a meeting of the Women's Committee was held at which the housewives were guests and the ranges were demonstrated.

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The month of June marked the organization of four new Women's Committees in Michigan and Ohio properties of the National Electric Power Company, including the Michigan Public Service Company at Traverse City, the Michigan Electric Power Company at Lapeer and the Ohio Electric Power Company (Northern Division) at Ravenna and (Southern Division) at Sidney. Miss Greilick will have charge of the work at Traverse City, Miss Bertha Goetze, Bad Axe, Miss Holtsberry, Ravenna, and Miss Pauline Reick at Sidney. Mrs. Pearl W. Evans of the National Electric Power Company, New York, who is a member of the National Women's Committee, assisted at the organization meetings.

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A recent number of *Northwestern Echoes* gives a report of a successful Women's Committee meeting at the convention of the North Central Division at Breezy Point, Minnesota. Mrs. Mabel Wilson, chairman, presided and a very interesting program was enjoyed.

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The results of the essay contest, "Pleasing Mr. and Mrs. Public," conducted by the Women's Committee of the Northwest Electric Light and Power Association, have just been announced by the chairman of the Division, Mrs. Nell Laws. Following are the prize winners:

First Prize: Miss Billie Russell, Northwestern Electric Co., Portland.

Second Prize: Miss Margaret Brady, Portland Electric Power Co., Portland.

Third Prize: Miss Eleanor Emery, Grays Harbor Railway & Light Co., Aberdeen, Washington.

Fourth place was a tie between: Miss Marguerite M. Brunney, Idaho Power Co., Boise, Idaho, and Miss Liberta Gore, California Oregon Power Co., Medford, Oregon.

This contest was most successfully conducted and a number of very original essays were obtained.

* * *

Miss Lenore Tamiesie of the Northwestern Electric Company, Portland, Oregon, was chosen Queen of Rosaria and will preside over the beautiful rose festival which is held annually in the city of Portland, Oregon. Considerable interest is shown in the selection of a Queen for this festival and the Women's Committee of the Northwestern Electric Company is to be especially congratulated upon having one of its members chosen.

* * *

At the request of the Portland Realty Board and the United Artisans, the Portland Electric Power Company permitted one of its women employees to enter the Rose Festival Queen Contest sponsored by the clubs and endorsed by the company. The Women's Committee of the Portland Electric Power Company is rejoicing that their candidate, Miss Irene Martin, won a place as Princess of the Festival.

* * *

Miss Mary K. Walsh, Chairman, Women's Committee, The Washington Water Power Company, was in charge of the program planned for the Victory Dinner given by the Spokane Business and Professional Women's Club. This dinner was given in celebration of a "Radio Marathon" conducted by the Spokane Business and Professional Women's Club in which $1,300 was raised by the organization for its educational fund. Miss Janet Hodges and Miss Helen Brown, both members of the Women's Committee, The Washington Water Power Company, appeared on the dinner program.

* * *

Miss Esther Rockey, Chairman of the East Central Division Women's Committee, reports an interesting meeting in connection with the recent Division Convention held at Louisville, Ky. A feature of the program, at which Miss Rockey presided, was a debate on the subject, "Resolved that Electricity is more Beneficial to the City Woman than to the Farm Woman." Miss Helen McMillan and Miss Mary Forte spoke on the affirmative side of the question and Miss Martha Hunt and Miss Emma Gillespie championed the negative. The judges were: Mr. W. S. Vivian, Director of Public Relations, Middle West Utilities Co., Chicago, Mr. Charles B. Scott, Director, Bureau of Safety, Commonwealth Edison Co., Chicago and Mr. Tom C. Polk, Secretary of the Great Lakes Division, N. E. L. A. It was the decision of the judges that the negative side of the debate won on points made, while from the point of view of public speaking Miss Helen McMillan, of the affirmative side, was declared winner. Mr. Paul S. Clapp, Managing Director, N. E. L. A., addressed the meeting, following the debate, and Miss Julie Pailet, Chairman Women's Committee, Southwestern Division, New Orleans, La., brought a message from the utility women of the southland. Other speakers on the program included Miss Myrtle Weldon, State Leader, Home Demonstration Agents, University of Kentucky, Miss Beulah K. Yewell, Kentucky State Chairman, who read a paper by Miss Fern Snider, Home Service Director, Monongahela West Penn Public Service Company, Fairmont, West Virginia, and Mr. Martin J. Insull.

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According to "Aurorean Club" bulletins—Northern Ohio Power & Light Company—The Women's Committee, under the direction of Edna D. Holloway, Chairman, has been holding some very interesting meetings. Recently the group made a trip to Cleveland to Nela Park, following which a contest was held for the best story of the trip and also another contest was held for the best talk to be given at the Women's Committee meeting following the trip. Every girl who made the trip was expected to give a short talk on whatever impressed her most.

* * *

A great many safety demonstrations have been given in Wisconsin. The Women's Committee of the Wisconsin Public Service Company has put on demonstrations in Chilton, Sheboygan, Reedsville, Green Bay, Plymouth, Manitowac, and Oakgrove, before a total of over three thousand persons. Organizations with which the girls worked included High Schools, Vocation Schools, Parent-Teacher Associations, Loyal Order of Moose, Y. W. C. A. classes, Red Cross Safety classes and Safety Schools. The Wisconsin Valley Electric Company Women's Committee gave two safety demonstrations in Wausau, one before the Parent-Teacher Association and the other the Lions Club, to a total of 134 people.

MAGAZINE ARTICLES

BELOW is a list of articles which appeared in various magazines recently that are especially interesting to Women's Committee members:

Good Housekeeping—July
- Hospitality with Comfort—B. Lawson Miller and T. L. Henderson
- Leisure Is a Trust—Mrs. John F. Sippel

Better Homes and Gardens—July
- Aids to Better Housekeeping—Mabel J. Stegner

House and Garden—July
- Obtaining Proper Home Illumination—Elizabeth Hallam Bohn.

Delineator—July
- You and Your Automatic Refrigerator

Woman's Home Companion—July
- Good Citizenship — Anna Steese Richardson
- Keeping Posted on Your Refrigerator's Temperature — Nell B. Nichols
- Push-Button Meals.

The House Beautiful—July
- A Lighting Plan for a House Beautiful House.

What Executives Should Expect from Women's Committees

MISS SOPHIA MALICKI, retiring Chairman of the Women's Committee, in a talk directed to executives of member companies made before the Public Relations Session of the recent Atlantic City Convention, said:

"The Women's Committee of your Company should be able to do these things:

- Correct any untruths or misunderstandings they meet either in their work or in social contacts outside of working hours.
- Explain why a utility company differs in corporate structure and regulation from other companies women are dealing with.
- Explain the rates domestic customers are paying—not the top rate to which most customers and our enemies are accustomed to refer, frequently not allowing for the discount—but the average rate that home-owners pay over a month or a year. Many of our own people do not realize how low the average domestic rate is. Our women should tell to all they meet of the constant reduction of electrical rates.
- They should understand that cost of electricity is not the deterring influence to electrification of households; that they pay a negligible fraction of their household expenditures for all the uses of electricity in the home, not only lighting.
- They should be able to tell all women they meet of your company's aim for the very best service at lowest cost.
- They should have earned the recognition and respect of homemakers and their organizations in your community and they should be called on to cooperate in activities toward home and community betterment.
- Representatives of homemakers should be coming into the meetings of your Women's Committee where they will come to know you better, your organization and your principles.
- Your Women's Committee should be the recognized authority on household electrical equipment in your territories.
- They should be telling homemakers through the home service department and the entire women's group about electrical housekeeping and they should help to establish it in every home.
- They should discover the little, and to us frequently insignificant, misunderstandings of homemakers with your service, which so often are the root of real mischief to best service.
- They should be teaching resuscitation and first aid to women's groups and they should take their place in community safety activities.
- In a word, they should, through their education and abilities, be intelligent representatives of your company on all occasions and in all places.

"These are not theories; they are items of work actually being done in all sections of the country.

"If your group is not doing these things, go over your committee program with your chairman. Give it a little of your and your executive's interest and counsel that the work may follow more closely your policies and your belief of what it should be.

"There can be no industry with a more loyal woman personnel, one so eager to translate to the public its pride in the achievements of its industry and its responsibility in the social advance of this country.

"If it is possible for one group to develop to a degree where its chief executive considers the women's committee one of the most important influences in building understanding between the company and the women of the community, it is possible for all committees whose executives have the same interest and give the same support.

"Homemakers are adopting the statement, 'ask light and power women.' We cannot disappoint that expectation."

CORRESPONDENCE

To the Editor:

In my article, "The Philanthropy of Tree Clearance Programs," which appeared in the February issue of the Bulletin, I outlined, briefly, the contribution toward civic betterment which public utility companies have made in their programs of lessening service interference from shade tree growth.

Not only do such programs have this significance; to us they exemplify the utility's interpretation of "service" and are typical of the real tenor of privately-owned administrative policies.

Primarily, the public utilities ask and expect line clearance. This may be secured without retaining the facilities of a scientific organization and at a slightly smaller initial expense than is entailed when such are employed. With the same desire for scientific perfection which has characterized the research activities of their own organizations, public utilities have seen behind the apparently non-technical process of "cutting a limb off" in tree trimming operations. They have engaged organizations which have included as integral requirements of their training courses for workmen not only fundamental understanding of the principles of electrical transmission, but a comprehensive knowledge of the structure of trees, their time and rate of sap flow, relative brittleness of wood, water content, susceptibility to insect and disease attacks, and the other intricate phases of tree growth. The administrative hazard, in this case unskilled workmanship, is clearly recognized. Possibilities of its occurence are reduced to a negligible minimum by the privately-owned utility company's interpretation of service.

Perhaps, from our chilly pinnacle of scientific research in horticulture, we have not seen the ramifications of the Public vs. Private Ownership question. Again, using as a basis of judgment our particular relations with the utility and discounting to the scuppers such easily-mouthed words as "monopoly," "combine," etc., we may have arrived at a sane and reasoning conclusion. In our opinion, private ownership of the utilities rests its worth on this principle: no individual, no private organization, building for advancement socially, financially, and culturally, without protective governmental immunity from criticism, is satisfied with less than the best in the discharge of its economic function. Private ownership recognizes the fact that in order to survive and grow it must give its best. It must render service, complete in every sense of the word, unhampered by the dangers of inefficient management and stagnation of service improvement through political football, by changing policies of administration, or the striving for individual advancement through party machinations rather than by sheer merit.

I am writing this letter in my study under the soft, pleasant glow of an electric lamp. I have just tasted delicacies which have been preserved by electrical refrigeration. The radio will soon be giving the music and entertainment of countless artists. My home has been cleaned by electricity, my food cooked by it.

The moon is coming up over the nearby hills. Silhouetted against it are the wires which bring happiness to my home. These pass through a row of beautiful trees but there has been no mutilation of branches, no destruction of symmetry to make way for the passage of electricity. Back along the graceful strands, over hill and valley to the power source where men of clear minds, unhampered by the dread of political disfavor are giving their best to the end that homes shall be warm in winter cool in summer, send constant yellow gleams into the falling shadows, and have the world of song and drama, education and culture at instant command.

So much for our interpretation of service and our immature opinion on the question of private ownership. Perhaps it is nothing in the way of a contribution; it is, at least, our effort to give expression to a sincere feeling that credit should go where credit is due.

G. M. Codding
The F. A. Bartlett Tree Expert Co.

SPECIAL COMMITTEES

Appliqué Lighting*

APPLIQUÉ Lighting is the name given to one of the newest developments in the field of decorative lighting by which an illuminated design can be easily applied to any suitable large background. It is particularly applicable to the decoration of building exteriors, and offers an interesting variation to illuminated displays obtained by flood lighting objects or by outlining them with strings of lamps.

Figure I illustrates the way in which this decorative material could be applied to a building. The effect, of course, would be much more striking if it were shown in color.

The term "appliqué" has been commonly used in the past for the flat ornamentation of a textile material background with patches or designs. As applied to this new development in the field of Illuminating Engineering it refers to patterns and designs made up of illuminated units of different form as shown in Figure II which can be attached to the facade of a building or to the object that is to be decorated with light.

The forms of the individual units have been so chosen that a great variety of interesting and pleasing patterns can be constructed from a relatively few standard shapes. These shapes include a diamond, circle, arc (90 deg.), bar, rectangle and spearhead. The relative size of the units can be judged from Figure II. The Illuminating Engineer has not only a carefully selected set of unit shapes to work with, but also a variety of colors by which the combinations can be still further diversified.

The brightness of these units when lighted has been set at a value so that even an intricate pattern will remain clear-cut and distinct when viewed at some little distance. By day the units possess considerable ornamental value as the form and color of the design are not lost.

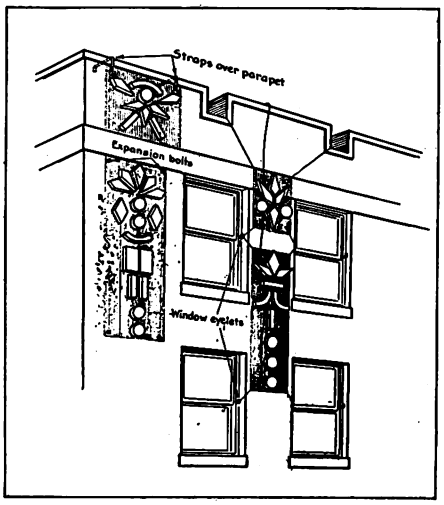

Fig. II

Appliqué lighting is particularly valuable in temporary installations where highly decorative effects are desired for some special event. It is flexible in its application; a given group of units is readily changeable into varied designs to suit the many different occasions that call for a lighted display. The wattage per unit runs from 20 to 50 according to size. Units have been made using exposed colored lamps running somewhat higher in total wattage. The additional load represented by such lighting can frequently be distributed over the present wiring of the building without exceeding its safe carrying capacity. The units can be installed easily and cheaply. The wiring of the units is made easy by the use of plug connectors by which they can be connected with each other and fed through cords carried through windows to outlets inside the building. The units are light in weight so that the problem of fastening them to the building is principally one of preventing their being dislodged by wind. Figure II shows methods of doing this.

Appliqué lighting adds another useful tool to the lighting specialist's kit and provides another attractive means for utilizing electricity in festival lighting and in general decorative displays of all kinds.

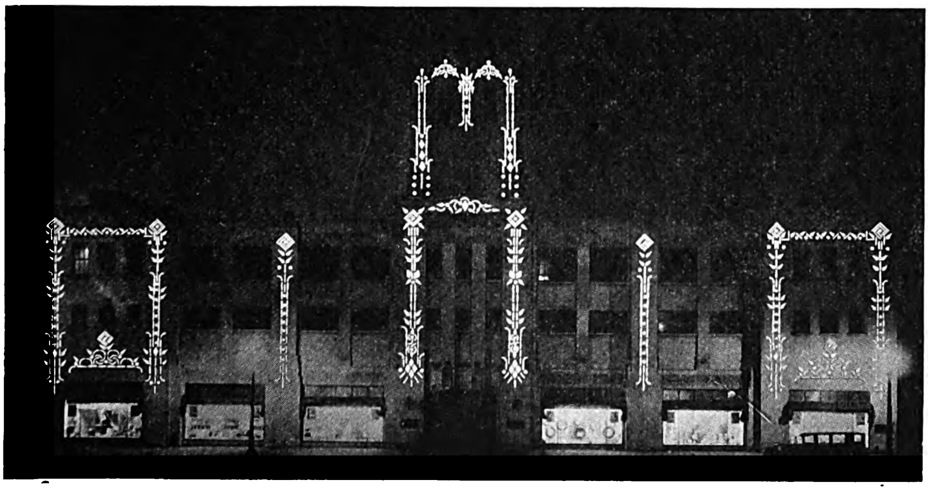

Fig. I

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* Article contributed by Lamp Committee, Frank W. Smith, Chairman.

"Investigate Electric Heat"

"INVESTIGATE Electric Heat." This slogan won the first prize of $250 in the recent industrial electric heat contest conducted by the joint committee on Electric Furnace Development of the National Electric Manufacturers Association and the National Electric Light Association. It was submitted by W. H. Steinhauer of the Engineering Department of the Toledo Edison Company, Toledo, Ohio.

The returns in the contest numbered approximately 800 and evidenced wide interest in the subject of industrial electric heat. Submittals were judged by a committee of three judges—R. T. Kaighin, G. W. Tall, Jr., and F. M. Feiker, representing the National Electric Light Association, the National Electrical Manufacturers Association and the Society for Electrical Development, respectively.

Second prize of $100 was awarded to C. H. Pfingsthorn, 106 West Lincoln Avenue, Mt. Vernon, N. Y., whose slogan was "Switch to Perfection with Electric Heat."

"Electric Heat is Cheaper Than Rejects" won the third prize of $50, and was submitted by E. A. Heath, 211 East First Street, Fond Du Lac, Wisconsin.

Papers for World Power Conference

PAPERS for the Tokyo sectional meeting of the World Power Conference, which will be held in that Japanese city simultaneously with the World Engineering Congress to assemble there next October, had up to June 10 been received from foreign countries as follows: From Great Britain, 11; the United States, 14; Germany, 11; Czechoslovakia, 1; Switzerland, 7; Denmark, 4; Sweden, 14; Italy, 1, Russia, 5. From Japan itself 50 papers had been listed, covering six sections of the conference.

WHAT OCCURRED LAST MONTH

Colorado River Project

The Los Angeles and Salt Lake Railroad has applied to the Interstate Commerce Commission for the right to construct a railroad extension from its present line south of Las Vegas, Nevada, to serve the proposed Boulder Dam.

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It has been announced in Salt Lake City that the sale price of power at Boulder Dam and the development of the Colorado River in Utah and other Upper Basin states will be the chief subjects of a six-states conference to be called by Governor Dern of Utah.

* * *

Dr. G. E. P. Smith, irrigation engineer at the University of Arizona, predicts that Boulder Dam will never be built. He thinks that the question will go to the Supreme Court of the United States and that there the project will be declared unconstitutional.

* * *

Representative Taylor of Colorado is seeking joint action by the four Upper Basin states to persuade the Federal Power Commission to continue a temporary embargo on all power permits along the Colorado River until a definite distribution program is agreed upon, which will protect all the states of the Basin.

* * *

Seeking to correct an impression that a large construction force is to be organized soon in connection with building the Boulder Dam project, Director General of the United States Employment Service Jones, in a statement on July 12, declares that construction of the project probably will not begin before 1930.

* * *

On July 16, the Colorado River Commission of Arizona decided that the Commission's legal staff shall make the necessary preparations to start litigation to protect the rights of Arizona in the Colorado River, and that the state should be ready to bring suit at once should the proposed tri-state agreement fall through.

* * *

Consolidations

Dispatches from Washington tell of a proposal offered by former Assistant Attorney-General Donovan for the creation of an Industrial Court as an agency of the Federal Government for determining in advance the legality of proposed mergers. The Donovan plan contemplates an agency similar to the Interstate Commerce Commission, which would have jurisdiction over all interstate trade and commerce, except public utilities. Business groups wishing to form combinations would lay their plans before the board which would give a decision in advance.

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The Nebraska Electric Power Co. has been consolidated with the Western Public Service Co.

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By acquiring the National Utilities Corporation, Ltd., controlling electrical plants at Port Alberni, the City of Alberni, and other points, the British Columbia Electric Railway Co. has gained control of all Vancouver Island utilities, with two exceptions.

* * *

On July 13, president J. N. Canavan of the Utilities Power & Light Corporation announced that St. Louis is to be linked with a power network extending to Louisville, Cincinnati and Chicago, through cooperative action of large utility units and construction of a new plant of the Indianapolis Power & Light Co. on the White River near Indianapolis.

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A recent Scripps-Howard dispatch from Washington says that the formulation of a definite policy for dealing with recent mergers is one of the difficult tasks confronting Attorney-General Mitchell and John Lord O'Brian, Assistant Attorney-General in charge of the Anti-Trust Division.

* * *

On July 13, Senator King of Utah, in a radio address broadcast over a large network of stations, discussed the mergers which have been taking place and declared that there has been no sustained vigorous effort to enforce the anti-trust laws.

* * *

On July 16, the plan to organize the Niagara-Hudson Power Corporation was declared operative by the committee in charge as a result of the deposit of more than two-thirds of the outstanding common stocks of the Buffalo, Niagara and Eastern Power Corporation, the Northeastern Power Corpration and the Mohawk-Hudson Power Corporation.

* * *

President Sloan of The New York Edison Co. stated on July 17 that creation of a single electric company to serve Manhattan, Brooklyn, Queens, the Bronx and Westchester County, and linking of the steam generating system of The New York Edison and affiliated companies with the hydroelectric system of the Niagara-Hudson Power Corporation, are among the plans which are being studied by officials of the New York Edison system.

* * *

The Public Service Commission of New Hampshire has authorized consolidation of the Baker River Light & Power Co. and the West Campton Light & Power Co. with the Pemigewasset Electric Co. (formerly the Plymouth Electric Light Company).

* * *

Consumption of Electric Current

Figures recently issued by the National Industrial Conference Board are to the effect that in 1912 the electrical industry had less than 4,000,000 customers, while in 1928 it had 23,000,000. In 1912, the electrical energy used was distributed as follows: Lighting, 30.5 per cent; industrial power 36.1 per cent; and electric railways, 33.4 per cent. In 1928, the distribution was: Lighting, 24.5 per cent; industrial power 66 per cent; electric railways 9.5 per cent.

* * *

Earnings of Public Utilities

Gross earnings of public utility enterprises in May, exclusive of telephone and telegraph companies, as reported to the Department of Commerce by 95 companies and systems operating gas, electric light, heat, power, traction and water services, were $189,750,000, as compared with $190,000,000 in April and $180,255,407 in May, 1928.

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Federal Trade Commission's Investigation

The National Education Association, meeting in Atlanta, Ga., adopted on July 2, a report of its Committee on Propaganda in Public Schools. This is a long and comprehensive study covering the whole field with only incidental reference to the utilities. In general, it holds that children should be taught how to think, not what to think, and should be prepared to evaluate material which may be classed as propaganda.

* * *

The Southern Newspaper Publisher's Association in annual convention on July 5 at Ashville, N. C., adopted a resolution drawn by Colonel Robert Ewing of the *New Orleans States* condemning the purchase of newspapers by interests affiliated with the power and newsprint industry as being "contrary to sound public policy and a menace to a free press and free institutions."

* * *

The annual meeting of the American Federation of Teachers in Chicago, July 5, adopted a resolution condemning "propaganda methods" employed by the "power trust."

* * *

July 15, the Federal Trade Commission sent to the Senate its Sixteenth Interim Report of the utilities inquiry. This says that since the last report examiners of the Commission have begun an examination of the accounts of six operating companies in three important holding company groups; that summaries are being prepared on the growth of capital assets and capital liabilities, the issuance of securities and the service fees of three holding companies, in preparation for public hearings; and that field work on the relations between utility companies and service organizations was completed at the offices of two of the more important management groups and work begun on two new groups and on one new sub-group.

* * *

On July 18, Judge Knox of the United States District Court for the Southern District of New York rendered his decision in the case brought by the Federal Trade Commission to compel the Electric Bond & Share Co. to produce certain books and papers, and to compel certain officers of the company to answer questions. The objections of the company to the subpoena requiring the production of books and papers are sustained. Those interposed to "pertinent and competent" questions propounded to individuals are overruled. The court does not determine which of the questions asked are "pertinent and competent." The court assumes that the company, as a part of its business, is engaged in interstate commerce, and says that, if the company wishes to contest this assumption, the matter will have to go to a Master for the taking of proofs; or, if the Federal Trade Commission wishes an adjudication to the effect that the intrastate business of the company is so intimately associated and connected with interstate commerce that all the company's activities are subject to its jurisdiction, a reference to a Master will be required to establish that fact. Either party may appeal from the decision within ninety days.

* * *

Foreign

Certain small cities in England have sent to the Government a joint manifesto expressing alarm over the purchase by American interests of British electric utility concerns.

* * *

On July 22, the $30,000,000 hydro-electric development on the Shannon River, Ireland, was officially inaugurated with appropriate ceremonies, and the waters of the river were in part diverted into the newly-built canal.

Information given out by the Department of Commerce is to the effect that the consumption of electricity in Great Britain increased about 10 per cent last year and has practically doubled during the past six years.

* * *

Hydro-Electric

The Public Utilities Commission of Tennessee, after conferences with the Federal Power Commission, has announced awarding certificates of necessity and convenience to the Holston River Power Co., subsidiary of the American Cyanamid Co., for three power projects on the Holston River in East Tennessee. Sanction for the projects must still be made by the Federal Power Commission. It is said that the proposed developments will cost about $35,000,000. The three projects will call for dams of 79, 135 and 130 feet in height.

* * *

The Canada Northern Power Corporation, Ltd., announces that a new power plant at Upper Notch, about 20 miles from Cobalt, on the Montreal River, will be erected at an early date. The proposed plant will cost about $1,000,000 and is expected to develop 13,000 horsepower. It is the intention to connect with the Canada Northern System for supplying power to the mines of Northern Ontario.

* * *

A dispatch from Toronto says that the Ontario Hydro-Electric Power Commission is negotiating for acquisition of several power sites in the vicinity of Ottawa. A member of the Commission declares that it is the Commission's policy to acquire, as far as possible, every power development in Ontario.

* * *

At Las Vegas, Nevada, on June 22, Secretary of the Interior Wilbur declared that the policy of the Administration with regard to great power and reclamation projects is to build the projects, protect the governments investment through contracts that will pay the money back into the treasury and then withdraw from the field. This course, he declared, would prevent the government's becoming involved in situations purely local.

* * *

A report of a survey made by the Geological Survey on the water power resources of the McKenzie River Basin, says that these amount to 442,000 hp. for 50 per cent of the time, and 289,000 hp. for 90 per cent of the time. The report estimates that if all the sites in the McKenzie Basin were developed and interconnected with a large power system, with steam standby to carry the load in dry seasons, the total usable power would equal twice the present requirements of the State of Oregon.

* * *

The Cumberland Falls Power Company has filed with the Federal Power Commission a brief presenting the wish of 200,000 residents of Kentucky that the company be given a fifty-year lease for development of the Falls.

* * *

July 20, the American Engineering Council announced membership of committees which will work with Congress and the Administration in shaping public policies involving engineering operations. There are committees on public affairs, on communications, on flood-control, on power and various other subjects.

* * *

On July 22, it was announced that the New York Water Power Commission had raised the rate on power-rights rented by the State to private companies from 75 cents per horsepower-year to $5 per horsepower-year. The rate was fixed on the application of the Niagara Falls Power Company. According to the *New York Times,* it is expected that the power company will challenge the legality of the Commission's decision, since it previously had a grant of similar facilities at the rate of 75 cents per horsepower-year.

* * *

An announcement made at Glens Falls, New York, on July 23 is to the effect that the Mohawk-Hudson Power Corporation has acquired water-power rights previously owned by the Union Bag & Paper Corporation on the Hudson River, near Hudson Falls. Construction will be started on a new hydro-electric station to develop about 75,000 horsepower.

* * *

July 24, Governor Roosevelt of New York, in an announcement made at Morrisburg, Ontario, said that he would present definite plans to the next Legislature for the development of the 1,000,000 potential horsepower at the International Rapids, near Barnhart Island.

* * *

Dispatches from Ottawa say that negotiations are under way with a view to arranging a conference of representatives of the Dominion Government and of the various provinces this fall on the subject of respective rights of the federal authorities and the provinces over water powers and navigation.

* * *

An Associated Press dispatch from Washington says that first reports on the most exhaustive inventory ever undertaken of the potential resources of 200 of the country's principal streams are being prepared by War Department engineers for submission to Congress in December. Congress authorized the study two years ago and has voted $12,322,000 to finance it.

* * *

A dispatch from Boise, Idaho, says that an application for 500 second-feet of water from the north fork of the Snake River has been filed with the Department of Reclamation. The application says that the water is to be used for power purposes and calls for construction of a dam 70 feet high. Under the new State law, the application will be advertised and a hearing opened to consider any protests.

* * *

Railway Classification

The Delaware, Lackawanna and Western Railroad has begun work on a construction program which will electrify 78 miles of roadway comprising 173 miles of track in north central New Jersey.

* * *

The Lehigh Valley Railroad has received bids for electrification of 75 miles of its main line between Mauch Chunk and Wilkes-Barre, Pennsylvania.

* * *

Rates

The Rawlings, Wyo., Electric Company, subsidiary of the Federal Light & Traction Company, New York, has put into effect a rate reduction of approximately 15 per cent, covering general lighting and street lighting.

* * *

The Northern New York Utilities, Inc., on July 1, put into effect reductions of about 25 per cent in forty towns and villages.

* * *

The Suburban Light & Power Company of Alliance, Ohio, has instituted a general reduction of 10 per cent in electric rates over its systems.

* * *

Reductions in rates of about 17 per cent have been put in effect by the Iowa Southern Utilities Company, which operates in 150 communities in the southern part of Iowa.

* * *

The California Railroad Commission is to hold hearings on August 27 and 29 concerning rates of the Pacific Gas & Electric Company and the Great Western Power Company. This is in continuation of hearings of June 4, when both companies presented evidence showing their present rates were reasonable.

* * *

The New York Edison Company and affiliated companies on July 16 announced another reduction in rates for Queens County. The initial rate will be cut from 8 cents a kilowatt-hour to 7 cents. It is estimated that this reduction means an annual saving to customers of $1,500,000. This follows a reduction of $4,500,000 announced by these companies last October.

* * *

The Pacific Power & Light Company announces a reduction of rates in Clatsop County, Ore., amounting to $30,000 a year.

* * *

The New Bedford, Mass., Gas & Edison Light Company has announced a rate reduction which will affect about 85 per cent of the consumers.

* * *

The North Dakota Railroad Board has approved revised rates proposed by the Northern States Power Company, the Red River Power Company and the Union Light Heat and Power Company, which affect a large part of North Dakota.

* * *

The amended electric rate schedule for Manhattan and the Bronx just approved by the New York Public Service Commission means a material reduction in rates for a group of large consumers. President Sloan of The New York Edison Company and associated companies is quoted as saying that the new classification will affect about 35 of the present large customers and is intended to stimulate larger wholesale use.

* * *

The Union Gas & Electric Company of Cincinnati has asked the Ohio Utilities Commission for permission to institute reduced rates for large primary power service.

* * *

Regulation

The Public Service Commission of New Hampshire has issued an order permitting export from the state of power developed at its Fifteen-Mile Falls plants on the Connecticut River by the Grafton Power Company, subsidiary of the New England Power Association. A clause in the order requires that all, or any part, of the power developed shall be available in New Hampshire when needed.

* * *

Governor Allen of Massachusetts has appointed three members of the special commission which is to study and report on activities of Massachusetts utilities. As the Senate and House members of the Committee were already appointed, the membership is now complete.

* * *

Governor Caulfield of Missouri has vetoed the so-called terminable permit bill passed at the recent session of the Missouri Legislature. The Governor contended that the measure invaded the charter rights of St. Louis. It was supported by many St. Louis officials and business organizations.

* * *

President Wyman of the Central Maine Power Company in a letter to stockholders concerning the referendum to be held September 9, when the question of export of current from the state is to be voted on, declares that if the export proposal becomes a law through a favorable vote it will mean a reduction of rates in Maine, the receipt of large sums of money by the State Treasury from taxes on export of current, more rapid development of the state's water power, and greater prosperity for the company.

* * *

According to the Portland, Me., *Telegram,* former Governor Brewster has announced his opposition to the power export bill.

* * *

On July 15, the committee appointed by Governor Roosevelt and the New York Legislature to inquire into the question of utility regulation in New York State held its first meeting and installed Colonel William J. Donovan, former Assistant Attorney-General, as counsel. Colonel Donovan presented an outline of a proposed program for the inquiry indicating a comprehensive survey of the whole situation. Members of the committee expressed their belief that the question of politics would be excluded. On July 17, Senator Knight, chairman of the committee, in an interview at Albany, said that the scope of the work would be to propose such amendments as would bring the Public Service Commission law up to date to meet existing business conditions and to make it conform to court decisions. On the same day, Frank P. Walsh, a member of the committee appointed by Governor Roosevelt, declared that the whole question of holding companies would undoubtedly be investigated by the committee and suggested that the committee might cooperate with the Federal Trade Commission and the Couzens Committee of the United States Senate in the fact-finding part of its work.

* * *

The Supreme Court of Nebraska has handed down a decision restraining the Interstate Power Company and subsidiaries from cutting rates at Hartington and at the same time the Court finds that electrical energy is a commodity and not a service. On this ground, its production, sales and distribution within the states are regulated by the anti-discrimination statute which prohibits a lower rate in one community, section or town, than in another where like conditions exist. The company

(*Continued on page 544*)

Picked up from

ELECTRICAL NEWS ITEMS

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Cost of Power in Manufactured Items

THE total amount spent for fuel and power by the industries of the country in 1927 was $1,897,337,523, according to the United States Census. This represents 7 per cent of the value "added by manufacture" (that is; the total selling value of all products manufactured, less the cost of raw materials used to make these goods,) and but 3 per cent of the grand total value of products.

Inasmuch as the item "fuel and power" represents not only power purchased from public utility enterprises and the fuel used by those plants that made power for themselves, but also coal used for blast furnaces, for the manufacture of gas and coke, oil used for heating, etc., it is evident that the actual *cost of power* is a very small item in the sum total of manufacturing expenses.

This is directly in line with a recent report of the Metropolitan Life Insurance Company based on a survey of Industrial Development in the United States and Canada. It was found that the so-called "Migration of Industry" accounts for only a very small percentage of the industrial development of American Communities and that the question of cheap power is subordinated to questions of market, labor, and transportation when industries are seeking locations.

Cathode Ray Used in Gem Testing

ACCORDING to an Associated Press Dispatch "the first commercial use for the famous cathode ray of the Coolidge tube has been found. Imitation sapphires are unmasked by the ray almost instantly and so thoroughly that they can be spotted in total darkness."

The stones, both imitation and real, are exposed for a few seconds to the powerful ray. All the imitations and all but one kind of genuine stone glow as if molten, but as soon as the ray is shut off the real sapphires lose the artificial glow while the imitations continue for some time to resemble live coals.

In addition to sorting stones, the ray can be used to determine where both natural and artificial gems come from.

"Should sapphires from Montana be mixed with stones that were supposed to come from Australia," said D. W. St. Clair, of the General Electric Company's standardizing laboratory, "we could find this out with the cathode rays. In the case of artificial stones we can determine which factory made them by the different tone of the glow while the rays are on.

Dr. W. D. Coolidge, of the General Electric Laboratories, who developed the tube, is seeking rays from still higher power—two or three million volts. His first tube, announced two years ago, uses 350,000 volts. Later, by a cascading arrangement of tubes, he obtained rays of 900,000 volts.

Horse-racing at Night

WE HEAR much these days about the changes which electricity has brought in the lives of the people. The standard of living has been raised to undreamed of heights; the worker is no longer a manual laborer, but a director of power; drudgery has been eliminated from the home; the farm is being turned into a miniature industrial plant; and what not.

At the same time we hear, every once in a while, of changes being made in the lives of domestic animals and even insects. Cows prefer the electrically operated milking machine to the old-fashioned hand power. Hens set about their business an hour earlier and stick closer to the job in coops lighted by the well-known incandescent bulb. Bees gladly start the honey-making season a month or two ahead of time if electricity is judiciously applied to their domiciles. It is even possible to raise "bigger and better" silver foxes on an electrified fox farm.

But it has remained for the Toledo Driving Club to put the racehorse to work at night. When the Board of Directors decided to illuminate the Fort Miami race track for night harness racing, other driving clubs and racehorse men throughout the United States were not convinced that the thing could be done. But it was done, and during the weeks of June 24th to June 29th, and July 8th to July 15th, lovers of harness racing from all over the country watched the fastest pacers and trotters in America contending for $150,000 in purses on an electrically lighted track by night as well as by day.

And the horses seemed to like it. For weeks prior to the opening of the meet they were given their daily work-outs at night. Drivers were dubious at first, and every precaution was taken to protect their expensive charges from fright or any attendant injury which might come from working under unaccustomed conditions. Shadow rolls, blinders, and in some cases even colored glass goggles were used on highly nervous horses. These precautions were apparently unnecessary, as the horses, from the first work-out, gave their drivers no trouble as far as lights and shadows were concerned.

Night horse-racing is successful, and undoubtedly has come to stay. Thousands of horse lovers, confined to offices, cannot attend daytime racing, but night-time racing can be patronized by all of the work-a-day world. Furthermore, the thoroughbred will work better in the early evening of a hot summer's day than he will under a blazing sun, and undoubtedly new world records will be established under the glare of electric lights.

A section of the Illuminated Race Track at Fort Miami

THE REVIEWING STAND

Development of Customers' Accounting Machines

Serial Report, Customers' Records Committee, Accounting National Section, N. E. L. A. Publication No. 289-74. 16pp. Price, 25 cents; 15 cents to members.

COMPANIES that are planning to install mechanical accounting appliances, or to extend their systems of mechanical accounting, will find in this report pertinent information on this subject.

Although the development and application within the past few years of mechanical devices used in public utility office accounting has opened a field of almost unlimited scope for study, this is perhaps the first detailed report describing the various kinds of equipment.

The report is based on answers to a questionnaire which was sent to all well-known manufacturers of mechanical devices of generally conceded importance, some 87 in number, from which 41 replies were received.—*E. S. B.*

Customer Ownership Committee

Serial report, Customer Ownership Committee, Public Relations National Section, N. E. L. A. Publication No. 289-78. 28pp. 3 illustrations; 2 tables. Price, 40 cents; to members 25 cents.

IN reviewing the work during the past year this report of the Customer Ownership Committee reveals that there has been a marked decrease in customer ownership financing in 1928 as compared with the five preceding years. Results for the year seem to reflect general conditions bearing upon the financing of capital requirements, and do not indicate any real loss of interest in customer ownership on the part of electric light and power companies. The reasons for this trend are clearly set forth in this report. A review of subscriptions to the National Better Business Bureau is given along with the customary statistical reports, and the Ten Cardinal Rules of Customer Ownership prepared by the Committee.—*E. S. B.*

Distillation Products of Coal

Serial Report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-69. 24pp. Price 30 cents; to members 20 cents.

IN discussing low temperature carbonization this report of the Prime Movers Committee reviews the present status and the future of the industry and discusses the possibilities of low temperature tar, the interest in the manufacture of resins, and foreign developments.

Statements are contributed by Dr. Fr. Mueller, Kohlen Scheidungs Gesellschaft, Germany, who has been interested and active in the development of the KSG process in Germany, and thinks that the outlook for low temperature distillation of coal is very promising in Germany and in the whole of Europe, and that undoubtedly there will be a field of operation for the various processes developed.

A statement by Dr. C. H. Lander, Director of the Fuel Research Board, Department of Scientific and Industrial Research of the English Government, also is included, as well as a statement by The Babcock and Wilcox Company.

Low temperature carbonization as discussed at the World Power Conference, London, 1928, and at the International Conference on Bituminous Coal, Pittsburgh, 1928, is reviewed in this report and a bibliography for 1927 and 1928 is given.—*E. S. B.*

Hydro-Electric Bibliography and Manufacturers' Statements

Serial report, Hydraulic Power Committee, Engineering National Section, N. E. L. A. Publication No. 289-86, 24pp., 23 illustrations. Price 40 cents; to members, 25 cents.

IN addition to a comprehensive bibliography of hydroelectric subjects prepared by the United Engineering Societies Library, this report includes statements by half a dozen leading manufacturers of hydro-electric equipment. These contributed statements describe progress in design and construction of hydraulic turbines and auxiliary equipment. Many illustrations of equipment are shown and three test curves showing results of efficiency tests for turbines of 2,250, 36,000 and 40,000 h. p. are reproduced.—*E. S. B*

Developing Electric Service for the Farm

Serial report, Rural Electric Service Committee, N. E. L. A. Publication No. 289-65. 20pp., 14 illustrations. Price, 40 cents; to members, 25 cents.

THIS is the second of a series of reports by the Rural Electric Service Committee portraying in detail the rural electric service departments of member companies. This report of the series deals with the organization and method of Alabama Power Co. for developing electric service for the farm.

In presenting these reports the committee points out that it does not pretend to recommend the plan of organization and operation of any one company. It merely presents the methods of these companies for what they may be worth to those undertaking the organization and operation of Rural Electric Service Departments.

A summary of rural electric service development by Alabama Power Co. is presented by its President, Thomas W. Martin, as an introduction to the report. The extent of the company's interest in Rural Electric Service development is indicated by the fact that the Alabama Power Co., within the past few years, has invested more than $2,000,000 to enable it to furnish rural electric energy and is now serving more than 6,000 Alabama farmers.—*E. S. B.*

Stoker Equipment and Furnaces

Serial report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-71, 40pp., 54 illustrations, 3 tables. Price 55 cents; to members, 35 cents.

THE tendencies to increase stoker size and the input of coal per square foot of grate area have brought about improvements that are in line with operating companies efforts to reduce boiler plant costs. Such improvements discussed in this report deal with furnace construction and methods of introducing air at the proper place and, in the proper proportion for satisfactory combustion.

Operating companies' statements given indicate that air distribution has not yet been worked out satisfactorily. Continued improvement in stoker design to reduce maintenance costs and to increase efficiencies is to be noted in the submitted statements by leading manufacturers.

Experiences with water cooled walls have been satisfactory. Although comparisons are being made of the value of refractory lined and water-cooled surfaces, the committee states that sufficient data were not available to be included in the report.

Experiences with fans and preheaters are discussed in detail. The report is well illustrated and data are presented in readable form. A bibliography is included.—*E. S. B.*

Higher Steam Pressures and Temperatures

Serial report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-73, 40pp., 39 illustrations, 10 tables. Price 55 cents; to members, 35 cents.

THE practicability of operation and the thermal economy of the 1200-lb. cycle is shown by operating companies and manufacturers statements in this report. In addition to statements on stations that have operated at the above pressure for some time the report includes recent installations of high-pressure equipment. The report is well illustrated throughout.

A statement submitted by Professor

A. E. White on the Behavior of Metals at Elevated Temperatures gives a possible reason for the fact that although temperatures of 650 to 700 deg. fahr. have been common with 300 and 400-lb. units, 750 to 775 deg. fahr. appears to be the present practical limit for 1200-lb. installations.

The design of higher pressure and temperature equipment in the future is discussed in a contributed statement by C. F. Hirsfeld. Another interesting statement is that contributed by Professor F. G. Straub on the Relation of Embrittlement to Higher Steam Pressures and Temperatures.

A section of the report gives data on the relative construction costs of 400 and 1200-lb. equipment.—*E. S. B.*

Training for Better Public Contact —Building and Conducting the Training Program

Serial report Industrial Relations Committee, Public Relations National Section, N. E. L. A. Publication No. 289-83, 20pp. Price 15 cents; to members, 10 cents.

THIS report, the third of the series on Training for Better Public Contact being published by the Industrial Relations Committee, outlines and describes methods of Building and Conducting the Training Program.

Of the many possible methods of carrying on public contact training, the report presents three methods which clearly illustrate the principles and the problems to be encountered. The advantages and disadvantages of each method is discussed in detail and on the basis of the experience and observation of companies who have used one or more of the methods. Methods of measuring results that have been obtained by these various methods of public contact training will be discussed in the final report of this series, which will be published shortly.—*E. S. B.*

The Use of a Fixed Capital Records System for Insurance and Taxation Purposes

Serial report, Fixed Capital Committee, Accounting National Section, N. E. L. A. Publication No. 289-79, 12pp. Price 15 cents; to members, 10 cents.

UTILITY executives are given in this report a valuable outline of the use of a Fixed Capital Records system for Insurance and Taxation purposes.

Many public utility companies now have a Fixed Capital Records system of some description and it has been proved that the benefits derived from such records are no longer theoretical but are established fact. This report shows how the records of a Fixed Capital Records System may be used to provide the data necessary for insurance and taxation purposes, and how these data can also be coordinated with, and used to regulate and control, insurance and tax records.

In the conclusion the report lists seven items of insurance and taxation records which are provided by a Fixed Capital Records System at less cost than they could otherwise be obtained.—*E. S. B.*

Spillway Gates on or Adjacent to Dams

Serial report, Hydraulic Power Committee, Engineering National Section, N. E. L. A. Publication No. 289-84, 36pp., 24 illustrations, 5 tables. Price 40 cents; to members, 25 cents.

CONFINED to the design, construction and operation of spillway gates in actual use by operating companies, this report of the Hydraulic Power Committee is a most valuable contribution on this subject. Not the least among the useful features of the report is a bibliography of subjects relating to spillway gates.

Typical installations and types of equipment which might be of value to operators and designers of such gates have been selected as reflecting the best engineering practice in the United States and Canada. Valuable information from European sources also is included.

The report indicates that there is an increased tendency to install permanent and substantial crest gates on dams rather than renewable flashboards and also that clear-crest dams have become the exception rather than the rule.—*E. S. B.*

Proceedings International Congress on Illumination, 1928

1443 pages. Published under the direction of executive committee, International Congress on Illumination, 29 West 39th St., New York, N. Y.

THE seventh plenary session of the International Congress on Illumination held last year at Saranac, N. Y., is actively recalled by the proceedings which are now available.

The papers and discussions are truly international in character as practically all the more important nations in the world participated in this historic conference. The text appear in the language in which it was presented, French, German or English. A summary of each item in both French and English is provided to facilitate reference.

The following are among the various subjects discussed in detail: Street Lighting, Glare, Automobile Headlights, Distribution of Luminous Flux, Test Plates in Photometry, Natural Lighting, Vocabulary, Lighting of Factories and Schools, Aviation Lighting, Definitions and Symbols, Colored Glasses for Signals, Diffusing Materials, Residence Lighting, Accuracy of Photometry, Photometric Standards, Heterochromatic Photometry, Moving Picture Lighting and Show Window Lighting. Selected papers from the 22nd Annual Convention of the Illuminating Engineering Society are also included.

This volume is not only valuable as a reference, but also as an indication of the development of the art of illumination in the various countries throughout the world.—*A. B. M.*

Public Utility Salvage Methods

Serial report, Purchasing and Storeroom Committee, N. E. L. A. Publication No. 289-55, 16pp., 3 illustrations, 1 table. Price 25 cents; to members, 15 cents.

FOR companies who wish to realize the highest possible return from salvage materials this report describes various salvage methods that experience has shown to be practical and profitable. This comprehensive review covers a wide variety of materials including electric appliances, common brick, lead covered cable, cinders, fiber conduit, office furniture, incandescent lamps, lumber, metals, oils, paper, tools, etc.

The report includes an analysis of cost of reconditioned material which is presented in tabular form and illustrations of a salvage furnace for burning insulation from cable, wire, etc.

A second part of the report describes a recommended method of listing, advertising and selling salvage material. —*E. S. B.*

Rate of Deterioration of Impregnated Wood-Pulp Cable Paper Subjected to Heat Only

Serial Report, Underground Systems Committee, Engineering National Section, N. E. L. A. Publication No. 289-87, 20pp., 13 illustrations, 1 table. Price 25 cents; to members, 15 cents.

THE results of an extensive investigation of wood-pulp paper insulation as reported by the Mass. Institute of Technology (Report 3, March, 1928) are discussed in this report of the Underground Systems Committee.

An appendix presents a summary of the portions of the Institute's report dealing with test methods, equipment, preparation of specimens, etc., and a discussion of the results.

The conclusion which the committee presents indicate that these tests performed on wood-pulp paper, as used by representative American Cable manufacturers, gave erratic results which were expected from previous tests of this type.

Results shown by the curves obtained from individual samples and different samples are depicted graphically and discussed in detail.—*E. S. B.*

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Arizona Utilities Association

President, M. A. Pooler, Tucson Gas, Electric Light & Power Co., Tucson, Ariz.; *Secretary,* L. C. McCullough, 134 South Central Avenue, Phoenix, Ariz.

ROCKY MOUNTAIN DIVISION

(Colorado, New Mexico, Wyoming)

President, W. D. Johnston, Mountain States Power Co., Casper, Wyo.; *Secretary,* O. A. Weller, Public Service Co. of Colorado, Denver, Colo.

The Colorado Utilities Association

President, H. S. Robertson, Denver Tramway Corp., Denver, Colo.; *Secretary,* O. A. Weller, Public Service Co. of Colo., Denver, Colo.

New Mexico Utilities Association

President, W. W. Nielsen, New Mexico Power Co., Santa Fe, N. M.; *Secretary-Treasurer,* Bernard L. Wiles, Albuquerque Gas & Electric Co., Albuquerque, N. M.

Wyoming Utilities Association

President, W. D. Johnstone, Mountain States Power Co., Casper, Wyo.; *Secretary,* F. A. Probst, Mountain States Telephone & Telegraph Co., Casper, Wyo.

SOUTHEASTERN DIVISION

(Alabama, Cuba, Florida, Georgia, North Carolina, South Carolina, Tennessee, Porto Rico)

President, T. H. Tutwiler, Memphis Power & Light Co., Memphis, Tenn.; *Secretary,* C. M. Kilian, 207-8 Bona Allen Bldg., Atlanta, Ga.

SOUTHWESTERN DIVISION

(Arkansas, Louisiana, Mississippi, Oklahoma, Texas)

President, Fred W. Insull, Public Service Co. of Oklahoma, Tulsa, Okla.; *Secretary,* S. J. Ballinger, San Antonio Public Service Co., San Antonio, Tex.

Arkansas Utilities Association

President, W. E. Bann, Southwestern Gas & Electric Co., Texarkana, Tex.; *Secretary,* R. I. Brown, Arkansas Central Power Co., Little Rock, Ark.

Mississippi Electric League

President, A. H. Jones, Jones-Johnson Co., McComb, Miss.; *Secretary,* A. R. Riddick, A. G. Riddick, Inc., Jackson, Miss.

Oklahoma Utilities Association

President, Thomas R. Weymouth, Oklahoma Natural Gas Corp., Tulsa, Okla.; *Secretary,* Edward F. McKay, 1020 Petroleum Bldg., Oklahoma City, Oyla.

Southwestern Public Service Association

President, Knox Lee, Southwestern Gas & Electric Co., Marshall, Tex.; *Secretary,* E. N. Willis, 403 Slaughter Bldg., Dallas, Tex.

***Note: This Division is in Process of Formation.**

SECTIONS, BUREAUS AND COMMITTEES

Chairmen's names only listed here

SPECIAL NATIONAL COMMITTEES

Advertising Committee—(To be determined.)

Charles A. Coffin Prize Committee—M. S. Sloan, The New York Edison Co., New York, N. Y.

Codes and Standards Committee—Irvin W. Day, The Connecticut Light & Power Co., Waterbury, Conn.

Constitution and By-Laws Committee—R. F. Pack, Northern States Power Co., Minneapolis, Minn.

Electrification of Steam Railroads Committee—Britton I. Budd, Public Service Co. of Northern Illinois, Chicago, Ill.

Exhibition Committee—E. W. Goldschmidt, Wagner Electric Corp., New York, N. Y.

Finance Committee—Sidney Z. Mitchell, Electric Bond & Share Co., New York, N. Y.

Lamp Committee—Frank W. Smith, The United Electric Light & Power Co., New York, N. Y.

Prize Awards Committee—W. H. Onken, Jr., *Electrical World,* New York, N. Y.

Public Policy Committee—P. S. Arkwright, Georgia Power Co., Atlanta, Ga.

Rate Research Committee—L. R. Nash, Stone & Webster, Inc., Boston, Mass.

Water Power Development Committee—Paul A. Schoellkopf, The Niagara Falls Power Co., Buffalo, N. Y.

Wiring Policy Committee—J. E. Davidson, Nebraska Power Co., Omaha, Neb.

GENERAL NATIONAL COMMITTEES

***Civic Development Committee**—John B. Reynolds, Middle West Utilities Co., Chicago, Ill.

***Educational Committee**—Fred R. Jenkins, Commonwealth Edison Co., Chicago, Ill.

***Insurance Committee**—W. H. Sawyer, Stevens & Wood, Inc., New York, N. Y.

***Membership Committee**—A. Jackson Marshall, National Electric Light Association, New York, N. Y.

***Rural Electric Service Committee**—Eugene Holcomb, Consumers Power Co., Jackson, Mich.

ACCOUNTING NATIONAL SECTION

***Section's Executive Committee**—W. R. Emerson, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

Budget Committee—B. F. Rodey, The United Electric Light & Power Co., New York, N. Y.

***Classification of Accounts Committee**—H. C. Hasbrouck, C. H. Hopson & Co., New York, N. Y.

***Customers' Records Committee**—E. W. Korsmeyer, Henry L. Doherty & Co., New York, N. Y.

Exhibit Committee—T. A. Wallace, Henry L. Doherty & Co., New York, N. Y.

***Fixed Capital Committee**—Thomas M. Ford, The Philadelphia Electric Co, Philadelphia, Pa.

***General Records Committee**—C. E. McBride, Electric Bond & Share Co, New York, N. Y.

***Purchasing and Storeroom Committee**—K. C. Campbell, The Detroit Edison Co., Detroit, Mich.

***Statistics Committee**—Harry A. Snow, The Detroit Edison Co., Detroit, Mich.

COMMERCIAL NATIONAL SECTION

***Section's Executive Committee**—Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

***Commercial and Industrial Power and Heating Bureau**—V. M. F. Tallman, Charles H. Tenney & Co., Boston, Mass.

Commercial Cooking Committee—O. Wilhelmy, The Union Gas & Electric Co., Cincinnati, Ohio

General Power Committee—H. C. Thuerk, Erie Lighting Co., Erie, Pa.

Industrial Heating Committee—J. L. Faden, The Edison Electric Illuminating Co., Boston, Mass.

***Lighting Bureau**—M. E. Skinner, New York Power & Light Corp., Albany, N. Y.

Commercial and Industrial Lighting Committee W. H. Horton, Jr., West Penn Power Co., Pittsburgh, Pa.

Electrical Advertising Committee—C. J. Eaton, Middle West Utilities Co., Chicago, Ill.

Home Lighting Committee—W. T. Blackwell, Public Service Electric & Gas Co., Newark, N. J.

Street Lighting Committee—R. J. Malcomson, Public Service Co. of Northern Illinois, Chicago, Ill.

***Merchandising Bureau**—Frank D. Pembleton, Public Service Electric & Gas Co., Newark, N. J.

Domestic Electric Range Committee—Frank A. Coupal, Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.

Merchandise Sales Committee—(Not determined).

Refrigeration Committee—(Not determined).

Water Heating Committee—Norman T. Wilcox, Stone & Webster, Inc., Boston, Mass.

***Customer Relations Committee**—H. T. East, Public Service Co. of Northern Illinois, Chicago, Ill.

***Wiring Sales Committee**—A. P. Good, Commonwealth Edison Co., Chicago, Ill.

ENGINEERING NATIONAL SECTION

***Section's Executive Committee**—A. D. Bailey, Commonwealth Edison Co., Chicago, Ill.

***Accident Prevention Committee**—C. R. Beardsley, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

***Electrical Apparatus Committee**—R. A. Hentz, The Philadelphia Electric Co., Philadelphia, Pa.

Engineering Administration Committee—W. E. Mitchell, Georgia Power Co., Atlanta, Ga.

Engineering Research Committee—C. F. Hirshfeld, The Detroit Edison Co., Detroit, Mich.

***Hydraulic Power Committee**—Byron E. White, Utica Gas & Electric Co, Utica, N. Y.

***Inductive Coordination Committee**—H. L. Wills, Georgia Power Co, Atlanta, Ga.

***Meter Committee**—A. S. Albright, The Detroit Edison Co, Detroit, Mich.

***Overhead Systems Committee**—Sydney Alling, The Rochester Gas & Electric Corp., Rochester, N. Y.

***Power System Engineering Committee**—L. W. W. Morrow, *Electrical World,* New York, N. Y.

***Prime Movers Committee**—R. D. DeWolf, The Rochester Gas & Electric Corp., Rochester, N. Y.

***Underground Systems Committee**—G. C. McCabe, The Detroit Edison Co., Detroit, Mich.

PUBLIC RELATIONS NATIONAL SECTION

***Section's Executive Committee**—HARRY REID, National Electric Power Co., New York, N. Y.

***Cooperation with Educational Institutions**—JOHN F. GILCHRIST, Commonwealth Edison Co., Chicago, Ill.

***Customer Ownership**—W. H. HODGE, Byllesby Engineering & Management Corp., Chicago, Ill.

***Industrial Relations Committee**—HOMER E. NIESZ, Commonwealth Edison Co., Chicago, Ill.

***Information Bureau Committee**—T. A. KENNEY, Allied Power & Light Corp., New York, N. Y.

Manufacturers' Advertising Committee—(To be determined.)

***Public Speaking Committee**—W. S. VIVIAN, Middle West Utilities Co., Chicago, Ill.

***Relations with Financial Institutions Committee**—CHARLES B. STUART, Halsey Stuart & Co., New York, N. Y.

***Women's Committee**—MISS SARA HARRIS, Utica Gas & Electric Co., Utica, N. Y.

***Provision is made for a representative from each Geographic Division.**

CONVENTIONS AND MEETINGS

Meeting of the Section, Bureaus and Committees of the National Electric Light Association are shown in roman type; those of other associations in italics

1929

August

2–6 *Camp Cooperation, Society for Electrical Development, Association Island, Henderson Harbor, N. Y.*

20 Executive Committee, Commercial National Section, Room 1741, Edison Building, Chicago, Ill.

22 Educational Committee, Room 950, Edison Building, Chicago, Ill.

27–30 ***National Association of Railroad and Utilities Commissioners, Glacier National Park Hotel, Glacier National Park, Mont.***

September

2–4 Rocky Mountain Geographic Division Hotel Colorado, Glenwood Springs, Colo.

4–6 Pennsylvania Electric Association, Bedford Springs Hotel, Bedford Springs, Pa.

9–12 New England Geographic Division, Hotel Griswold, New London, Conn.

9–13 ***American Society for Steel Treating, Cleveland, Ohio.***

9–14—*Association of Edison Illuminating Companies, Quebec, Canada.*

19–20 Empire State Gas and Electric Association, Saranac Inn, Saranac Lake, N. Y.

23 Executive Committee, Accounting National Section, Palmer House, Chicago, Ill.

24 Executive Committee, Public Relations National Section, Room 1741, Edison Building, Chicago, Ill.

24–27 *Illuminating Engineering Society, Bellevue-Stratford Hotel, Philadelphia, Pa.*

25 National Executive Committee, Room 1741, Edison Building, Chicago, Ill.

26–28 Great Lakes Geographic Division, French Lick Springs, Ind.

28–30 ***American Electric Railway Association Convention and Exhibit, Municipal Auditorium, Atlantic City, N. J.***

30 ***National Safety Council, Stevens Hotel, Chicago, Ill.***

30 Hydraulic Power Committee, William Penn Hotel, Pittsburgh, Pa.

30 Overhead Systems Committee, William Penn Hotel, Pittsburgh, Pa.

30 Power System Engineering Committee, William Penn Hotel, Pittsburgh, Pa.

30 Prime Movers Committee, William Penn Hotel, Pittsburgh, Pa.

October

1 Executive Committee, Engineering National Section, William Penn Hotel, Pittsburgh, Pa.

1 Hydraulic Power Committee, William Penn Hotel, Pittsburgh, Pa.

1 Overhead Systems Committee, William Penn Hotel, Pittsburgh, Pa.

1 Power System Engineering Committee, William Penn Hotel, Pittsburgh, Pa.

1 Prime Movers Committee, William Penn Hotel, Pittsburgh, Pa.

1–2 Accident Prevention Committee, William Penn Hotel, Pittsburgh, Pa.

1–4 ***American Electric Railway Association Convention and Exhibit, Atlantic City Auditorium, Atlantic City, N. J.***

1–4 ***National Safety Council, Stevens Hotel, Chicago, Ill.***

2–3 Electrical Apparatus Committee, William Penn Hotel, Pittsburgh, Pa.

2–3 Inductive Coordination Committee, William Penn Hotel, Pittsburgh, Pa.

2–3 Meter Committee, William Penn Hotel, Pittsburgh, Pa.

2–3 Underground Systems Committee, William Penn Hotel, Pittsburgh, Pa.

7–10 ***Third National Fuels Meeting, American Society of Mechanical Engineers, Bellevue-Stratford Hotel, Philadelphia, Pa.***

7–11 *National Electrical Manufacturers Association, Wardman Park Hotel, Washington, D. C.*

14–18 ***American Gas Association, Atlantic City, N. J.***

17–18 Kansas Section, Wichita, Kan.

22 ***The Electric Association, Chicago, Ill.***

22 Public Policy Committee, Edison Building, Chicago, Ill.

23–24 Public Utilities Association of West Virginia, Charleston W. Va.

November

21–22 Public Utilities Association of Virginia, Chamberlain-Vanderbilt Hotel, Old Point Comfort, Va.

December

2–4 Secretaries' Conference, Drake Hotel, Chicago, Ill.

NEW MEMBERS

Light and Power Companies, Employees of Light and Power Companies, Invited Persons, Manufacturing Companies, Employees of Manufacturing Companies, Associated Companies, Employees of Associated Companies and Foreign Organizations who have recently become Members of the National Electric Light Association.

NOTE: Names of new individual members are shown in the following order: First, in italics, post office address of company employing new members, and on the same line, in Roman letters, the name of the company employing new members; on succeeding indented lines, names of new members followed by post office address.

(July List—Continued from preceding issue)

- *Maine, Augusta,* Central Maine Power Company
  - Wallace A. Price
- *Maryland, Baltimore,* Consolidated Gas Electric Light & Power Co.
  - Arthur W. Albaugh
  - M. C. Albrittain
  - C. A. Brunner
  - Harry M. Burriss
  - C. L. Freeman
  - Chester S. Stackpole
  - Raymond P. Stansbury
  - William T. Taymans
- *Massachusetts, Boston,* The Twin State Gas & Electric Company
  - John C. Treanor
- *Michigan, Detroit,* The Detroit Edison Company
  - L. M. Grow
- *Michigan, Jackson,* Consumers Power Company
  - Robert J. Fowler (Flint, Mich.)
- *Minnesota, Duluth,* Minnesota Power & Light Company
  - A. E. McMillan
- *Minnesota, Minneapolis,* Northern States Power Company
  - H. W. Hopewell
- *New Jersey, Atlantic City,* Atlantic City Electric Company
  - Henry M. Cohen
  - Fred T. Ellenberg
  - George E. Haney
  - Miss Katherine A. Hannum
  - Miss Kathryn V. Hickey
  - Benj. F. Lee (Bridgeton, N. J.)
  - Walter A. Mathis
  - Wilbur S. Postoll
- *New York, Brooklyn,* Brooklyn Edison Company, Inc.
  - Elmer G. Hery
  - Alfred M. Temme
- *New York, Mt. Vernon,* Westchester Lighting Company
  - Andrew M. Anderson
  - Henry C. Borman
  - H. M. Brundage, Jr. (Scarsdale, N. Y.)
  - Charles F. DeLade (North Tarrytown, N. Y.)
  - Hans Prendle (Mt. Kisco, N. Y.)
  - Eugene H. Rosenquest, Jr. (Bronxville, N. Y.)
- *New York, New York,* Henry L. Doherty & Company
  - Chandler G. Burrows
- *New York, New York,* Electric Bond & Share Company
  - M. W. Brower
  - D. H. Couch
  - George Crawford
  - Juan B. Fuentes
  - Charles F. Haas
  - Mauro F. Herlitzka, Jr.
  - Fernando J. Lobo
  - Arthur Robottom
  - Francisco Valacha
- *New York, New York,* The New York Edison Company
  - Christian M. De Chauny
  - John S. Kerins
  - Hugh J. Ward
- *New York, New York,* United Electric Light & Power Company
  - Charles Livingston Ellis
  - Clyde J. Smith
- *New York, Long Island City,* New York & Queens Electric Light & Power Co.
  - Francis J. Baroncini (Flushing, L. I.)
  - George K. Volland (Jamaica, L. I.)
- *New York, Potsdam,* St. Lawrence County Utilities, Inc.
  - C. P. Scheller
- *New York, Poughkeepsie,* Central Hudson Gas & Electric Corp.
  - George H. Landis

- *New York, Rochester,* Rochester Gas & Electric Corp.
  - C. E. Jeerings
  - J. G. Little
  - J. S. Summers
- *North Carolina,* Raleigh, Carolina Power & Light Company
  - Wm. L. Yoder
- *Ohio, Cincinnati,* The Union Gas & Electric Co.
  - C. Kenneth Magers
- *Ohio, Cleveland,* The Ohio Public Service Company
  - V. O. Moore (Alliance, Ohio)
  - J. C. Welsh (Alliance, Ohio)
- *Ohio, Columbus,* The Columbus Railway, Power and Light Co.
  - Lyle Babbitt
  - Roy A. Brown
  - Morgan L. Evans
  - Chas. Gillivan
  - James K. Hall
  - M. M. Hanson
  - B. W. Marr
  - John N. Schwartz
  - C. C. Slater
  - William A. Wolls
- *Oregon, Portland,* Northwestern Electric Company
  - Fredric Seward Beach
  - Jesse D. Ellis
  - Ray C. Vivian
  - Day Ward
- *Pennsylvania, Allentown,* Pennsylvania Power & Light Company
  - Mrs. Millie Adams (Sunbury, Pa.)
  - R. J. Bachman (Catasauqua)
  - Miss Madeline B. Bercher (Pottsville)
  - M. E. Beyer, Jr. (Hazleton)
  - Mrs. Emily C. Billiard (Bethlehem)
  - Marie E. Bittenbender (Hazleton)
  - Colborn E. Blaisdell
  - Leo Chas. Bobb (Milton)
  - Ivy L. Bommer (Hazleton)
  - Miss Rachel K. Bowen (Sunbury)
  - G. L. Bowes (Lock Haven)
  - Helen A. Bratsch (Bethlehem)
  - W. S. Brokenshire, Jr.
  - H. M. Brown (Williamsport)
  - James Brown (Harrisburg)
  - Harry Chamberlain (Shamokin)
  - Harry L. Chamberlain, Jr. (Nesquehoning)
  - E. E. Chubbuck
  - Charles T. Cockey (Kingston)
  - William F. Coover (Jersey Shore)
  - Frances V. Courtney (Shenandoah)
  - Thomas Cowley (Bloomsburg)
  - Mrs. Helen Crane (Harrisburg)
  - Louis E. Curtis, Jr.
  - Miss Frieda G. Dammrich
  - Dorothy M. Daniel (Harrisburg)
  - J. R. Danner (Hazleton)
  - Mrs. Martha K. Deibler (Williamsport)
  - Richard Dougherty (Bethlehem)
  - Charles A. C. Eastman (Catasauqua)
  - Ralph W. Eilenberger (Stroudsburg)
  - Miss Elinore Engelman (Williamsport)
  - Miss P. Irene Evans (Slatington)
  - Miss Anna Faber (Wilkes-Barre)
  - D. C. Findlay
  - Miss Harriet Fisher (Mt. Carmel)
  - Miss Sue B. Flood
  - Richard Forbes (Pine Grove)
  - William A. Gallagher
  - Earl P. Garey (Sunbury)
  - Miss Mary A. Gavin (Catasauqua)
  - Edwin H. Gearhart (Williamsport)
  - Sheldon R. Gearhart (Forty Fort, Kingston)
  - James Gill (Hazleton)
  - M. F. Gill
  - Mrs. Jennie Graham
  - Lewis E. Gray (Williamsport)
  - F. A. Grimm
  - Mrs. Estella Haag (Harrisburg)
  - H. S. Hafleigh (Hazleton)
  - E. A. Hagenbuch (Mt. Carmel)
  - Murray C. Haines
  - Maurice H. Hall
  - Walter Hammernick (Mt. Carmel)
  - Howard J. Hann (Mt. Carmel)
  - Miss Viola M. Harlacher (Wilkes-Barre)
  - Miss Mary I. Harley
  - Miss Ethel M. Harwi
  - John M. Harwick
  - Miss Marie E. Hassler
  - Miss Helen M. Heffelfinger (Catasauqua)
  - Miss Minnie C. Heffelfinger (Catasauqua)
  - Edward R. Heil (Steelton)
  - Miss Gertrude M. Heller
  - Paul Holtz
  - Miss Eleanor M. Howe (Pottsville)
  - J. F. Hughes
  - Francis S. Hummel (Northumberland)
  - J. A. Hunter (Danville)
  - C. B. Huston
  - Harriet A. Irvin (Lehighton)
  - Frederick G. Keller
  - Miss Edna Klinger (Freeland)
  - Miss Mildred S. Kurtz (Muncy)
  - Paul W. Lambert
  - Carolyn M. S. Langford
  - Miss Sara E. Law (Lock Haven)
  - Miss Rose A. Lenahan (Wilkes-Barre)
  - C. E. Lewis (Pine Grove)
  - Miss Elsie V. Lichty (Fullerton)
  - Nettie Lithgow
  - John E. Ludeman
  - L. Z. Ludorf (Wilkes-Barre)
  - Walter R. McGee
  - F. R. McLean (Hazleton)
  - John B. Macfarlane (Harrisburg)
  - Edward G. Marsh (Stroudsburg)
  - Luther J. Mattern (Millersburg)
  - Franklin T. Merkle (Pine Grove)
  - J. A. Metz (Hazleton)
  - George Meyers
  - Lalla Michael (Millersburg)
  - E. W. Middleton (Hazleton)
  - George H. Milford (Hazleton)
  - Chas. C. Millar (Hawley)
  - F. V. Miller
  - Fred R. Miller (Honesdale)
  - Harold S. Miller (Lemoyne)
  - Miss Sadie B. Miller (Williamstown)
  - Alice L. Minor (Wilkes-Barre)
  - Miss Edna Mohr
  - Russell E. Moll (Sellersville)
  - L. Grace Moore (Milton)
  - John A. Mower (Minersville)
  - Miss Margaret Mullahey (Shenandoah)
  - H. H. Muschlitz
  - Miss Margaret Nell (Hawley)
  - H. B. Nelson
  - John W. Nicklas (Harrisburg)
  - I. W. Nye
  - Miss Grace O'Donnell
  - James Oliver (Hawley)
  - William H. Opp (Bethlehem)
  - Frank W. Packer
  - Miss Verna I. Peters
  - A. D. Pfeiffer (Williamsport)
  - Miss Genevieve A. Phillips (Williamsport)
  - J. Lane Polk, Jr.
  - C. L. Pollard (Pottsville)
  - James M. Ralston (Pottsville)
  - Roy U. Rapp (East Greenville)
  - Elvin E. Raub
  - Miss Eleanor J. Reed
  - John P. Reynolds, Jr.
  - Samuel L. Robbins (Hazleton)
  - Arthur J. Rockafeller (Danville)
  - Mabel Rupp (Steelton)
  - Miss Anna M. Schlegel
  - E. B. Schleppy (Hazleton)
  - Beula E. Schlicher
  - Albert Schuck (Shamokin)
  - L. Peter Schultz (Bethlehem)
  - Thomas E. Schuyler
  - C. B. Seib
  - H. L. Sell
  - H. T. Senseman (Harrisburg)
  - W. J. Senseman (Harrisburg)
  - Roy R. Shaak (Sellersville)
  - A. E. M. Shafer
  - Ben C. Shelley (Montgomery)
  - Marie Helen Shunk (Bethlehem)
  - H. T. Slaboski (Northampton)
  - Elmer W. Smith (Bethlehem)
  - Gordon F. Smith (Milton)
  - Miss Helen R. Smith (Williamsport)
  - W. R. Smith
  - Mrs. Louise M. Strome (Wilkes-Barre)
  - Miss S. M. Sweitzer
  - C. W. Taylor
  - Miss Virginia E. Tebbs (Stroudsburg)
  - Miss Geraldine M. Thomas (Jersey Shore)
  - Miss Jennie M. Thomas (Frackville)
  - James C. Thompson (Harrisburg)
  - A. J. Tobias (Tremont)
  - Stanley C. Townsend
  - E. E. Turner (South Williamsport)
  - Henry G. Wagner (Hazleton)
  - Miss Lillie Wagner (Lemoyne)
  - Arthur Vernon Ward
  - Miss Lelia E. Warner (Wilkes-Barre)
  - Ray Weirman (Bloomsburg)
  - Harold B. Weiss
  - E. P. Welch
  - W E. Welsh
  - Miss Marion I. Wetzel
  - G. E. Wheeler (Williamsport)
  - Rose R. Whittle (Harrisburg)
  - C. C. Wiker (Harrisburg)
  - John L. Wilhelm (Tamaqua)
  - Thomas Williams (Lansford)
  - J. H. B. Yeaton (Girardville)
  - James Yochum (Bethlehem)
  - Charles H. Yost
  - Pearl Zickler (Hazleton)
  - J. Harold Zimmerman
- *Pennsylvania, Carlisle,* The Carlisle Gas & Water Co.
  - Pauline Blaine
- *Pennsylvania, Lancaster,* Edison Electric Company
  - Joseph L. Scheinis
- *Pennsylvania, Norristown,* Philadelphia Suburban Counties Gas & Elec. Co.
  - William F. R. Munnick (Philadelphia, Pa.)
- *Pennsylvania, Philadelphia,* The Philadelphia Electric Company
  - B. Elliott Buchanan
  - John J. Cox
  - Miss Virginia Forkert
  - Dr. Wm. P. Hearne
  - Miss Bertha L. Martin
  - David H. Siegfried
  - Miss Florence R. Slocum
  - Vernon H. Spencer
  - Miss Nan R. Webb
  - Clifford Winner
- *Pennsylvania, Philadelphia,* The United Gas Improvement Company
  - L. A. Sommar
- *Pennsylvania, Pittsburgh,* Duquesne Light Company
  - R. E. Polk
  - Frank B. Saunders
  - A. W. Stevenson
- *Pennsylvania, Pittsburgh,* West Penn Power Company
  - L. F. Blassingham
  - Lawrence E. Jeffreys (Canonsburg)
- *Vermont, Chester,* Chester Power & Light Co., Inc.
  - R. W. Babcock
- *West Virginia, Charleston,* Appalachian Electric Power Company
  - M. A. Steckel
- *Canada, Quebec, Montreal,* Montreal Light, Heat & Power Consolidated
  - H. W. Haberl, Esq.

Manufacturers (Class D)

- *Illinois, Chicago,* American Concrete Marbelite Company
- *Illinois, Rock Island,* Rock Island Mfg. Co.
- *Massachusetts, Boston,* Tower Mfg. Co.
- *Michigan, Detroit,* Electrovent Corporation
- *Michigan. Detroit,* Whitehead Refrigeration Company
- *New York, Buffalo,* Remington Rand Business Service, Inc.
- *New York, New York,* Luckenbach & Hallberg, Inc.
- *New York, Rochester,* Vacuumizer Manufacturing Corporation
- *Ohio, Cleveland,* Hi-Voltage Equipment Company
- *Ohio, Cleveland,* The Proctor & Schwartz Electric Co.
- *Ohio, Dayton,* The Master Electric Company

Employees of Manufacturing Companies (Class E)

- *California, San Francisco,* Pacific Electric Manufacturing Corporation
  - C. F. Lomont (Gary, Ind.)
- *Connecticut, New Haven,* Whirldry Corporation
  - J. E. Murphy
  - Geo. Reama
- *Connecticut, Waterbury,* Beardsley-Wolcott Mfg. Co.
  - Mrs. Bessie L. Potts (Boston, Mass.)
- *Illinois, Chicago,* Benjamin Electric Mfg. Co.
  - Arthur M. Stevens (Des Plaines, Ill.)
- *Illinois, Chicago,* Edison Electric Appliance Co.
  - C. J. Anderson (Portland, Oregon)
- *Illinois, Chicago,* Federal Electric Company
  - D. H. McKindley
- *Illinois, Chicago,* Schweitzer & Conrad, Inc.
  - J. P. Lane (St. Louis, Mo.)
- *Illinois, Macomb,* Illinois Electric Porcelain Company
  - C. W. Kettron
  - J. W. Ward
- *Illinois, Rock Island,* Rock Island Mfg. Co.
  - H. W. Stickle
- *Massachusetts, Medford Hillside,* Doble Engineering Company
  - Charles A. Bachelder
- *Michigan, Detroit,* Electrovent Corporation
  - D. M. Rollins
- *Michigan, Detroit,* Knott & Garlius Company
  - A. M. Berger (New York, N. Y.)
  - F. L. Blanchard
  - A. L. Horn
  - G. E. Stedman
- *Michigan, Detroit,* Whitehead Refrigeration Company
  - H. V. Collins
  - T. C. Whitehead (River Rouge, Mich.)
- *Michigan, Grand Rapids,* Leonard Div. of Kelvinator Corp.
  - A. D. McCaughna
- *Missouri, Centralia,* Chance Company
  - A. Bishop Chance
  - N. C. Husted
- *Missouri, St. Louis,* Electrol Incorporated
  - J. L. Coppe
  - L. E. Saxby (Upper Montclair, N. J.)
- *Missouri, St. Louis,* Wagner Electric Corporation
  - H. N. Felton (New York, N. Y.)
  - P. Loyd Lewis (Kansas City, Mo.)
  - R. W. Piper (Richmond, Va.)
- *Nebraska, Omaha,* Clark Electric Water Heater, Div. of McGraw Elec. Co.
  - Harold E. Burritt (New Haven, Conn.)
- *New Jersey, Newark,* Weston Electrical Instrument Corporation
  - C. H. Bartlett
  - R. T. Pierce (New York, N. Y.)
  - R. P. Romain
- *New York, Albany,* Hynes & Cox Electric Corp.
  - E. G. Bardwell
  - Hervey A. Brown (Birmingham, Ala.)
- *New York, Buffalo,* Remington Rand Business Service, Inc.
  - Peter J. Theobalt

- *New York, Jamestown,* Blackstone Mfg. Company
  - P. Seward Moynihan
- *New York, Mt. Vernon,* Ward Motor Vehicle Co.
  - John C. Clendenin
- *New York, New York,* Burndy Engineering Co., Inc.
  - L. W. Thompson (Los Angeles, Cal.)
- *New York, New York,* Electrical Research Products, Inc.
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- *New York, New York,* General Office Equipment Corporation
  - Edward Gilmore
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  - Frank A. Trimp
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  - Alexander Seidl (Bolinas, Cal.)
- *New York, New York,* Tork Clocks, Inc.
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- *New York, Rochester,* Robeson Rochester Corporation
  - F. K. Robeson
- *New York, Rome,* Rome Wire Company
  - Glenn E. Rolston (Philadelphia, Pa.)
- *New York, Schenectady,* General Electric Company
  - M. T. Bard (Cleveland, Ohio)
  - F. M. Corliss (Cleveland, Ohio)
  - J. J. Donovan (Cleveland, Ohio)
  - L. W. Driscoll (Atlanta, Ga.)
  - H. J. Jenkins (Cleveland, Ohio)
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  - W. E. Landmesser, Cleveland, Ohio)
  - G. S. Miller (Philadelphia, Pa.)
  - M. F. Mahoney (Cleveland, Ohio)
  - A. C. Mayer (Cleveland, Ohio)
- *New York, Syracuse,* Syracuse Washing Machine Corporation
  - W. J. Semlow
  - Burton K. Sheldon
- *Ohio, Alliance,* The Buckeye Twist Drill Co.
  - J. C. Rodman
- *Ohio, Cleveland,* Electric Vacuum Cleaner Company
  - C. C. P. Shelley (Chicago, Ill.)
- *Ohio, Cleveland,* The P. A. Geier Company
  - T. C. Kase
  - B. H. Woodruff
- *Ohio Hamilton,* The Estate Stove Company
  - J. Arthur Nichols (Windsor, Ontario, Canada)
- *Ohio, Mansfield,* Ohio Brass Company
  - Floyd Bovard (Barberton, Ohio)
  - Ephraim H. Brown
  - W. B. Fincher (Dayton, Ohio)
  - Richard Fishback
  - N. M. Garland (New York, N. Y.)
  - F. W. Gorman (El Paso, Tex.)
  - R. C. Goss (Philadelphia, Pa.)
  - Ray Higgins (Barberton, Ohio)
  - P. G. Hobart
  - T. B. Jones (Dallas, Tex.)
  - G. L. McCreery (Barberton, Ohio)
  - J. A. MacIntosh (Barberton, Ohio)
  - A. M. Morris (Barberton, Ohio)
  - H. R. Sampson (Kansas City, Mo.)
  - J. M. Strickler
  - R. H. Walker (Barberton, Ohio)
  - P. L. Warren (Chicago, Ill.)
  - J. W. Watkins (Seattle, Wash.)
- *Pennsylvania, East Pittsburgh,* Westinghouse Electric & Mfg. Co.
  - L. Gale Huggins (Birmingham, Ala.)
- *Pennsylvania, Glassport,* Copperweld Steel Company
  - L. S. Monroe
- *Pennsylvania, Philadelphia,* American Engineering Company
  - James B. Copeland (New York, N. Y.)
  - C. E. Harrison
  - Geo. H. James
  - G. J. Zanke (Chicago, Ill.)
  - Ralph W. E. Leach (Winchester, Mass.)
  - Wm. S. Major (Cincinnati, Ohio)
  - Robert O'Shea
  - Herbert A. Peck
  - D. A. Polhemus (Pittsburgh, Pa.)
  - H. E. Preston
  - Elmer V. Strickler (Cleveland, Ohio)
  - Herbert Wells (Llanerch, Pa.)
- *Pennsylvania, Philadelphia,* James G. Biddle
  - Wm. B. Creagmile (Norwood, Pa.)
  - Elmer E. Lange
  - E. H. Wannemacher
  - T. B. Whitson (Moylan, Pa.)
- *Pennsylvania, Philadelphia,* Decorative Lamp and Shade Company
  - Samuel B. Gilpin
  - William H. Shelmerdine
- *Pennsylvania, Philadelphia,* Electric Service Supplies Company
  - G. E. Ackerman
  - J. L. Brown
  - Geo. Hart
  - R. Kreinberg
  - J. B. Miller
  - I. W. Schmidt
  - W. H. Smaw
- *Pennsylvania, Philadelphia,* Leeds & Northrup Company
  - G. D. Bradshaw (Pittsburgh, Pa.)
  - Lee H. Coleman
  - Walter R. Coley
  - David T. Graham (Jenkintown, Pa.)
  - Joseph C. Hess
  - Morris E. Leeds
  - R. A. Mason
  - J. C. Melcher
  - Harold R. Ranken
  - Charles S. Redding
  - Alexander H. Reynolds, Jr.
  - Carlisle J. Roberts
  - J. W. Robinson
  - Louis Teker
- *Pennsylvania, Philadelphia,* Philadelphia Electrical & Mfg. Company
  - W. H. Wiggin
- *Pennsylvania, Philadelphia,* Philadelphia Storage Battery Company
  - Harry B. Brown
- *Pennsylvania, Pittsburgh,* Standard Underground Cable Co.
  - H. G. Richardson (Washington, D. C.)
  - Edgar E. Rumple (New York, N. Y.)
- *Pennsylvania, Pottstown,* Automatic Electric Heater Company
  - A. Reeves Colburn
  - A. C. Drew (Philadelphia, Pa.)
  - William S. Wallace (Rochester, N. Y.)
- *West Virginia, Huntington,* The Armstrong Electric & Mfg. Corp.
  - Jack Hoskin
  - B. E. Peters
- *Wisconsin, Madison,* Hankscraft Company
  - C. W. Brown (Morristown, N. J.)
  - M. W. Hanks
- *Wisconsin, Milwaukee,* Allis-Chalmers Mfg. Company
  - A. K. Birch
- *Canada, Ontario, Niagara Falls,* Canadian Ohio Brass Company, Ltd.
  - M. W. Manz
- *Canada, Quebec, Montreal,* Northern Electric Co., Ltd.
  - C. T. Nisbet, Esq. (St. Johns, N. B., Canada)

Associated Companies (Class F)

- *California, Los Angeles,* Leon E. Clark
- *California, Los Angeles,* Phillip H. Gough
- *Massachusetts, Boston,* Milhender Electric Supply Company
- *New Jersey, Maplewood,* V. C. Kylberg
- *New York, New York,* Quaw & Foley
- *Ohio, Oxford, O. E. Kumler,* Electrical Contractor
- *Pennsylvania, Philadelphia,* Newburger, Henderson & Loeb

Employees of Associated Companies (Class G)

- *California, Los Angeles,* Phillip H. Gough
  - Jim Addis
  - H. B. Harris
- *California, San Francisco,* Pacific States Electric Company
  - J. O. Presbrey
- *Illinois, Chicago,* Power Plant Engineering Company
  - Chester R. Earle
- *New York, New York,* Columbia Casualty Company
  - Roger N. Williams
- *New York, New York,* Electrical Record
  - H. L. Hildenbrand
  - Roger L. Knight
- *New York, New York,* Ives & Davidson
  - David Fox
- *New York, New York,* Stevens & Wood, Inc.
  - C. D. Eash (New York, N. Y.)
  - Archie LeRoy Morgan (Jackson, Mich.)
- *New York, New York,* Trojan Engineering Corp.
  - A. J. Dolder
- *Ohio, Cleveland,* The Rae Advertising Company
  - Frank B. Rae (Berkeley, Cal.)
- *Pennsylvania, Philadelphia,* General Electric Supply Corporation
  - William E. Bowler

Foreign Members (Class H)

- *Republic of Panama, Panama City,* Compania Panamena de Fuerza Y Luz
- *Prussia, Berlin,* A. Borsig—G.m.b.H.

Employees of Foreign Members (Class I)

- *Republic of Panama, Panama City,* Compania Panamena de Fuerza Y Luz
  - C. F. MacMurray

(August List)

Electric Light and Power Companies (Class A)

- *New York, N. Y.,* American Commonwealths Power Corporation

Employees of Electric Light and Power Companies (Class B)

- *Alabama, Birmingham,* Alabama Power Company
  - Herbert R. Frankel, New York, N. Y.
  - C. T. Hunter, Jasper, Ala.
  - S. D. Summers (Southeastern Pr. & Lt. Corp.)
- *Arkansas, Pine Bluff,* Arkansas Power & Light Co.
  - C. C. Eiland
  - R. E. Ritchie
- *California, Riverside,* Southern Sierras Power Co.
  - J. P. Rexer, Wellton, Ariz.
- *California, San Francisco,* Great Western Power Company
  - R. G. Falkner Nuttall
  - T. Emmet Ward, Napa, California
- *California, San Francisco,* Pacific Gas & Electric Company
  - Clifford Bartlett, San Rafael, Calif.
- *Colorado, Denver,* Public Service Co. of Colorado
  - E. Clinton Jansen
  - Chas. Rump, Grand Junction, Colo.
- *Connecticut, Derby,* The Derby Gas & Electric Co.
  - F. D. Downs
- *Connecticut, East Hampton,* Central Connecticut Power & Light Co.
  - Earle L. Pike, Providence, R. I.
- *Connecticut, Hartford,* Hartford Electric Light Company
  - E. H. Clapp
- *Connecticut, Waterbury,* Connecticut Light & Power Co.
  - Herbert E. Eyre, Norwalk, Conn.
  - William E. Harrison
  - W. Irving Hubbell, Norwalk, Conn.
  - Cecelia A. Phelan
  - David W. Price, Norwalk, Conn.
  - Henry B. Reardon, Bristol, Conn.
- *Delaware, Wilmington,* Delaware Power & Light Company
  - William Benson
  - W. F. Burrows
  - Lee Kimble
  - M. G. Kinney
  - W. Earl Lind
  - Thomas J. Manley
  - Cassin G. Pritchard, Drexel Hill, Pa.
  - Walter J. Scott
  - Campbell B. Wilson
  - Marie E. Witt
- *Washington, D. C.,* Potomac Electric Power Company
  - George Bisset
  - James G. Gray
  - Dwight G. Howerth
  - W. Jefferis Lank
  - Linwood E. Reed
  - George C. Scheuch
- *Georgia, Atlanta,* Georgia Power Company
  - H. W. Cothran
  - Roland Ellis, Macon, Ga.
  - A. C. Henderson, Macon, Ga.
- *Illinois, Chicago,* Byllesby Engineering & Management Corporation
  - L. F. Chambers
  - Winsor Martin
- *Illinois, Chicago,* Commonwealth Edison Company
  - F. W. Bainbridge
  - Miss Anne Bryce
  - Miss Edith Cook
  - G. S. Howland
  - Miss Agnes Kinberg
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  - Bertrand C. Sherwood
  - John F. Sullivan, Jr.
  - Eric W. Swift
  - W. J. Wenrich
  - Frank H. White, Jr.
  - Taylor P. Willerton
  - Stacy T. Williams
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  - Harry J. Vance, Decatur, Ill.
- *Illinois, Chicago,* Midland Utilities Company
  - H. A. Ehrmann, Winnetka, Ill.
  - W. A. Pennington
- *Illinois, Chicago, Public Service Co. of No. Illinois*
  - C. G. Bennett
  - Verne L. Hahneman, Waukegan, Ill.
  - Andrew F. Hole, Elmwood Park, Ill.
  - R. J. Morrison
  - Wm. H. Sinder
  - William M. Walsh, Cicero, Ill.
  - Ray Warren, Oak Park, Ill.
- *Illinois, Chicago,* Utilities Management Company
  - Reginald D. Woodcock, Lansdowne, Pa.
- *Illinois, Chicago,* Utilities Power & Light Corp.
  - Geo. C. Eggers
  - H. L. Imes
  - G. C. Miller, Asbury Park, N. J.

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Indiana, Hammond, Northern Indiana Public Service Co.
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Indiana, Indianapolis, Central Indiana Power Co.
L. B. Schiesz
Indiana, Indianapolis, Interstate Public Service Co.
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A. D. Jones
Iowa, Davenport, Peoples Light Company
E. J. Otterbein
Iowa, Sioux City, Sioux City Gas & Electric Co.
C. R. Tracy
Kentucky, Louisville, Louisville Gas & Electric Co.
E. R. Clark
Maine, Augusta, New England Public Service Co.
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Massachusetts, Boston, New England Power Co.
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Massachusetts, Boston. Stone & Webster, Inc.
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Massachusetts, Lowell, The Lowell Electric Light Corporation
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Massachusetts, Lynn, Lynn Gas & Electric Co.
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Massachusetts, North Adams, North Adams Gas Light Co.
James B. Ryan
Massachusetts, Pittsfield, Pittsfield Electric Company
Norman K. Fuller
Massachusetts, Salem, Salem Electric Lighting Co.
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Mexico, Mexico City, Mexican Light & Power Co.
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Michigan, Bad Axe, Michigan Electric Power Co.
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Michigan, Detroit, Detroit Electric Company
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Minnesota, Minneapolis, Northern States Power Co.
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Nebraska, Scottsbluff, Western Public Service Co.
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Malcolm McLean, New Rochelle, N. Y.
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Frank R. Knowles, Johnstown, Pa.
J. W. Stoke, Easton, Pa.
Morris Tracy, Geneva, N. Y.
New York, N. Y., W. S. Barstow & Company
Artemas E. Ward
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New York, N. Y., Columbia Gas & Electric Corporation
Francis B. Flahive
Harry M. Wade
New York, N. Y., Henry L. Doherty & Company
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Edgar E. McWhiney
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New York, N. Y., The United Electric Light & Power Co.
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C. W. Nieman, Bethlehem, Pa.
New York, Long Island City, New York & Queens Elec. Lt. & Pr. Co.
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New York, Niagara Falls, The Niagara Falls Power Co.
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New York, Nyack, Rockland Light & Power Co.
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New York, Ossining, Northern Westchester Lighting Co.
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New York, Watertown, Northern New York Utilities, Inc.
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North Carolina, Raleigh, Carolina Power & Light Co.
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Ohio, Cincinnati, Columbia Engineering & Management Corp.
H. Edwin Olson, New York, N. Y.
Ohio, Cincinnati, Union Gas & Electric Co.
Wm. O. Kayser
Ohio, Cleveland, Cleveland Electric Illg Co.
Edw. J. Nieder
Ohio, Cleveland, Lake Erie Power & Light Company
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Ohio, Cleveland, The Ohio Public Service Company
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Smither Merrill
Ohio, Youngstown, The Pennsylvania-Ohio Power & Light Co
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Pennsylvania, Kingston, Luzerne County Gas & Electric Corp.
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Complete Service

(*Continued from page* 474)

to preserve this confidence. It is a very delicate thing and can easily be lost. The American people are fair in their judgment when they have the facts—real facts—upon which to base their judgment. Business is now giving the facts to the public in every way it can. The most successful businesses are those which are the most informative.

Business always needs public confidence, and this confidence can only be obtained if business men themselves inform the public about all phases of their businesses. What we need more than anything else are campaigns of honest, informative publicity by businesses, so that the man in the street will understand that what is being done is for the greatest good of the greatest number. If that is not what any business is doing then it should be out of business, and it can test itself most readily by frank and open publicity. That is the significance and the value of the work your Section is carrying on.

Behind the Veil

(*Continued from page* 485)

other day, at Sir John Pringle's table, where I had the pleasure of dining with Franklin, Priestly and other great geniuses."

Perhaps one of the most amusing publications is that of John Wesley, the founder of Methodism. In 1759 he issued his "Desideratum; or Electricity Made Plain and Useful, by a Lover of Mankind and Common Sense." In this, he relates at great length, the cures of numerous physical and moral ailments, attributed to the employment of the electric fluid, under such curious headings as "Electricity the Soul of the Universe," "Electricity, the Greatest of All Remedies," etc.

There are many other names appearing in the scientific history of the last half of the 18th century, but space forbids even the most limited description of their work. So we will pass on, next month, to the beginnings of the 19th century with Sir Humphry Davy and the history of the electric arc light.

A Public Relations Yardstick

(*Continued from page* 479)

Employees trained improperly — the strings flat—customers dissatisfied—the brass sharp—narrow visioned management—the conductor incompetent—and our orchestra becomes an object of ridicule and contempt. That is why we must have a definite plan to harmonize the efforts of our five factors. *Every* factor must be in tune.

How will others see us after we have brought this about? They will see that we are an institution of character—a worthwhile, desirable citizen of every community we serve. They will see that we are honestly trying to live up to the simplest and finest code of business ethics yet given to men—

"Do unto others as you would have them do unto you."

A complete list of all N. E. L. A. publications will be sent upon application to the Sales and Order Department, National Electric Light Association, 420 Lexington Avenue, New York, N. Y.

What Occurred Last Month

(*Continued from page* 530)

concerned operates in more than forty towns.

* * *

The Washington, D. C., *Times* says that the Corporation Counsel of the District of Columbia is about to make a sweeping investigation of the ownership of capital stock in all public utilities of the District.

* * *

The Supreme Court of Nebraska has held unconstitutional a law passed in 1927 permitting the creation of hydro-electric districts of one or more units, either urban or rural, on the ground that the Legislature unlawfully delegated legislative powers to the courts, by leaving to their discretion the questions of public policy, convenience and welfare as related to the organization, incorporation, boundaries, powers and government of the proposed districts. This is the fourth law intended to permit farmers to organize districts which has failed to meet constitutional requirements.

* * *

Sources of Power

The City of Charlotte, N. C., has in operation a gas engine which makes use of sewage sludge gas derived from the city's sewage-collection system. During one month the gas supply produced about 25,000 kw-hr. of power. Similar engines have been in use in England.

* * *

An article in the New York *Times*, July 7, says that the Philadelphia and Reading Coal and Iron Company is to enter into large-scale production of electric power by the use of coal-dust accumulated at its collieries.

* * *

Textile Plant Bought by Utility Company

Controlling interest in the Bates Manufacturing Company of Lewiston, Me., a cotton textile manufacturing plant, has been acquired by the New England Public Service Company, a subsidiary of the Middle West Utilities system. A New York *Times* dispatch from Chicago quotes a spokesman for the Insull interests as saying that it is their intention to invest in New England textile enterprises to "forestall financial ruin and consequent distress to numerous communities through enforced idleness of thousands of workers."

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The professional man plants his feet upon a law of the universe, a great ideal, and defies chance, accident and fate.

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ACTIVE METERS IN VACANT PREMISES
R. F. Bonsall

Based upon experience extending over a period of more than fifteen years, the plan of leaving meters in vacant houses and apartments has proved to be a decided factor in good will building. In addition considerable savings in operating expenses has been affected.

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THE PRESIDENT'S PAGE

The Best Tribute

IT IS fitting that this number of the N.E.L.A. BULLETIN be given over to honor Mr. Edison. Light's Golden Jubilee will be an international celebration to his great gift to humanity — the incandescent lamp — in which all electric interests will participate with other business and civic interests. The electric industry, however, owes to itself a special recognition of his genius and a special tribute to this man, out of whose labor and vision has come the great public servant which our industry is.

More than any other man, living or dead, Edison contributed to make electricity USEFUL to humanity. He brought it into the realm of practical workaday life where its energy could light our ways and bear our burdens. Combining the gifts of the scientist and the business man, he was able to invent, manufacture and distribute, all to the end that electricity might be put to work and life might be made easier and better.

In the fifty years since Edison produced his lamp, the electric industry has become a major factor in the economic scheme of our land. Yet he himself says it is only "a squalling baby" compared with what it will grow to be. It will be our job and the job of our successors to make it ever more useful to mankind—to relieve humanity of every task which electricity can be brought to do. That will be our industry's best tribute to Edison who showed us the way.

MSSloan

President.

N·E·L·A· BULLETIN

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NATIONAL ELECTRIC LIGHT ASSOCIATION

A Voluntary Organization of Companies Engaged In, and Individuals Affiliated With, or Interested In, the Electric Light and Power Industry: "Organized to Advance the Art and Science of the Production, Distribution and Use of Electrical Energy for Light, Heat and Power for Public Service."

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MR. EDISON, this is your magazine.

We hope that you will feel pleased with it and accept it as another symbol of the esteem and affection held for you by those who are laboring in the industry that is so beholden to you.

There will be many who will feel hurt because they were not invited to contribute to it. It was a most difficult thing to decide who would be asked. Somewhat through desperation, an arbitrary method was used.

Three representative groups of men were selected, and from these lists, in hit or miss fashion, the names were taken.

We hope that the pride of those chosen will not suffer from this revelation. They will recognize that there are many, many others who had equal claims to be heard.

May you and that Admirable Band—the Edison Pioneers—enjoy with yet another generation the Diamond Jubilee of the Incandescent Lamp.

Of this issue, 27,000 copies have been printed; 22,893 for members of the Association and subscribers to the N.E.L.A. BULLETIN, *the balance for friends of Mr. Edison throughout the world*

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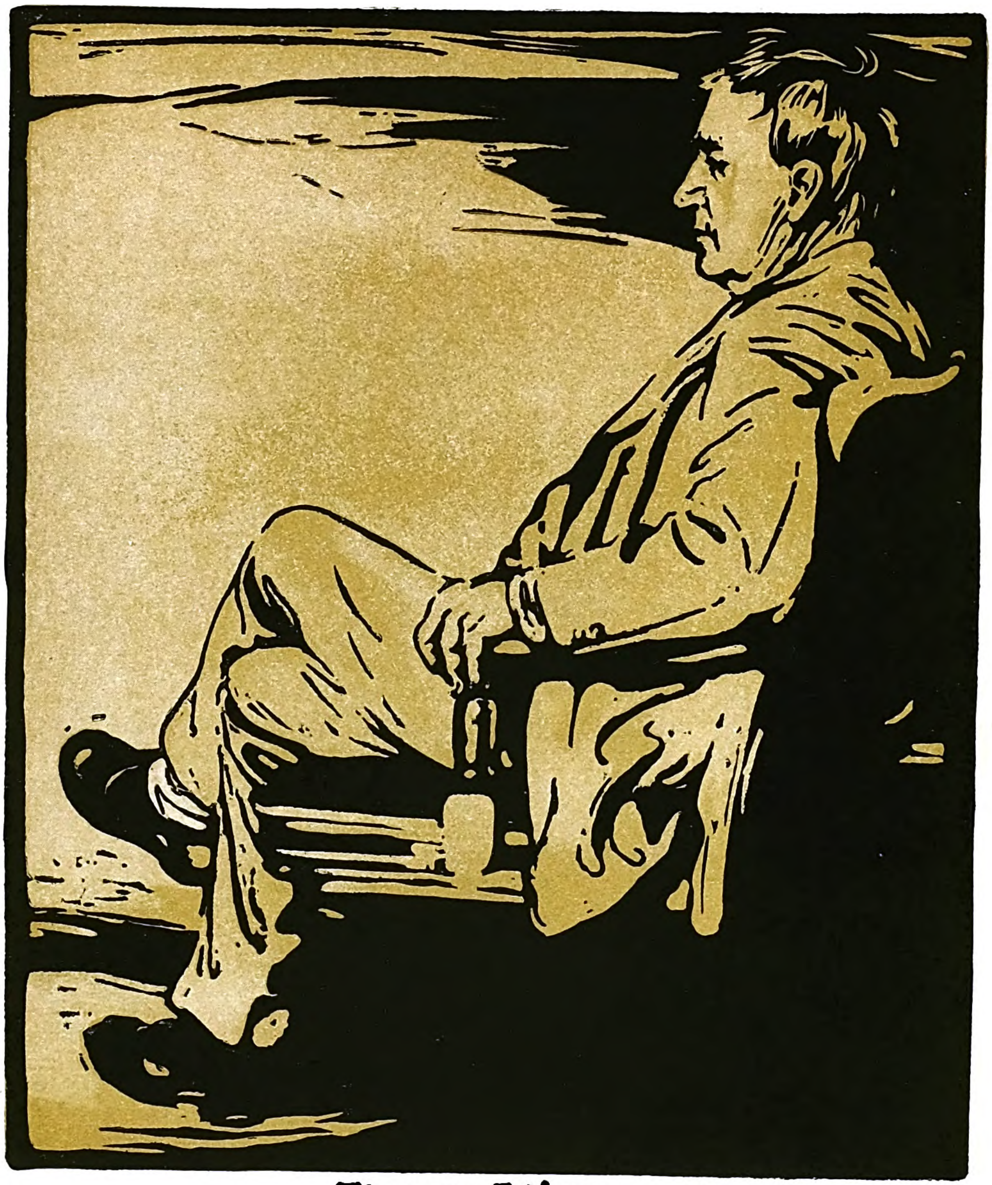


Thomas Edison.

FROM THE WOODCUT BY WILLIAM NICHOLSON

Circa 1903

N·E·L·A·
BULLETIN

September, 1929 Vol. XVI No. 8

THE PIONEER

By WILLIAM S. BARSTOW

President, The Edison Pioneers

IT is indeed a privilege to live in a period which has witnessed the birth and practical development of a great industry. It is even more of a privilege which the Edison Pioneer has enjoyed to have been associated with such a birth and development. Although many of the Pioneers have passed away, those who remain well remember the long days and nights of uninterrupted labor which finally produced results which Mr. Edison himself states were far beyond his thoughts at the start.

The high resistance filament, resulting in what was termed "subdivided light," was the beginning of a revolution in lighting, the effect of which we can even now see no end. Many an obstacle, seemingly insurmountable, Mr. Edison overcame through his perseverance, courage and optimism. Nor were his efforts confined to a single field, but wherever new discoveries could result in benefits to mankind, there he was found laboring at all hours of day and night.

During his many experiments to find a solution of a problem, Mr. Edison would frequently come across certain unusual phenomena, which, while not bearing directly on the problem in question, were of such importance that he carefully noted them at the time for further investigation. Thus, while developing the lamp, he noted what was termed the "Edison Effect," and which was the foundation of the radio tube of today. In these very early days he took out a patent (1879), for wireless communication, and the illustrations showed it in use on land and sea. Many notes are now preserved and will no doubt act as a guide for future investigations.

The value of Mr. Edison's contributions to the welfare, comfort and amusement of his fellowmen can never be measured, as on them, no doubt, will be founded many new developments in years to come.

The Pioneers, in their many years of close association with "the old man," have learned not only to admire his outstanding genius and ability to solve the most difficult problems, but to treasure as well his lifelong friendship. With the familiar twinkle in his eye, he many times enlivened the long hours with a joke or a good story. He often confessed that the most interesting parts of his many magazines were the last pages of jokes. Today, at the age of eighty-two, when many are resting from life's labors, he does not hesitate to take up the solution of practical problems in new fields, and in this he has been remarkably successful. He is a true example of his own saying, "All things come to him who hustles while he waits."

By JOHN W. LIEB

Chairman, The Edison Pioneers Sponsoring Committee for Light's Golden Jubilee

AS I sit at my desk under a speaking likeness of Mr. Edison, my memory goes back to the strenuous yet happy days many years ago when the old pioneers worked and labored under the immediate personal inspiration of the great master's tireless energy and boundless enthusiasm.

Day and night, in season and out of season, we followed the new roads of progress disclosed to us by the genius whom we worshipped, and no obstacle was too great, no exercise of the imagination was too lofty, in the endeavor to follow the leadership and guidance of him, whose thoughts and aspirations seemed so far beyond human ken and our feeble comprehension.

A few hasty enigmatic words of instruction, the merest pencil scratches to serve as a sketch, an insatiate desire to learn the results long before an actual test of the new idea could be made, an unquenchable desire to search out new facts and invade new fields of knowledge, these were the guide posts that urged us on in our every fibre to meet the promptings and follow the instructions of this greatest of pioneers.

These, then, are the memories that crowd around us as we contemplate that friendly, kindly and benign, yet strong and determined face of the man, whose achievements and the practical applications of whose ideas in our lives have worked such a marvelous change in the forward march of civilization, and which the world will recognize on Oct. 21, with a celebration in honor of one of his outstanding accomplishments, by celebrating Light's Golden Jubilee.

May the world continue for many years to come to benefit by the inspiration of his life and work. May he continue to enjoy health, vigor and happiness, and may those of us who have had the distinguished privilege to contribute in even the most humble and insignificant measure to the realization of the dreams of this great genius, live over again in joy and happiness the memories of the pioneering days of half a century ago.

Milestones of Progress in a Great Industry

A Brief Perspective

By FRANK J. SPRAGUE

THE half-century anniversary of Edison's invention of a practical incandescent light is a fitting time to briefly review the modern milestones of progress in a great industry, which has contributed so much to a changing civilization, and in particular his contributions to it and his influence thereon.

This period has been marked by four major epochs—the creation of the lamp itself, with its system of supply and distribution, the development of the industrial motor, the inauguration of electric traction and the invention of the alternating current system. Of these Mr. Edison has been chiefly identified with the first, his labors in the other fields having been negligible or experimental, and in that of the alternating current nil. Hence, I venture the prediction that in the final analysis his greatest fame will rest upon his accomplishments in what I may term the "domestication" of the electric light.

CONSIDER for a moment the conditions existing fifty years ago. There had been many experiments with both arc and incandescent lights, and the former, particularly as developed by Brush, was in successful commercial use. As early as '59 Prof. Moses G. Farmer had lit a room with incandescent lamps comprising a metal filament inclosed in a glass globe from which air had been exhausted, and pencils of carbon similarly enclosed had been tried. Self-exciting dynamos for both alternating and continuous current had been developed by Pacinotti, Gramme, Siemens, Farmer, Weston and a host of others, and the reversible function demonstrated, the series, multiple and combined methods of coupling up translating devices in electrical circuits were well known, and every water, gas and steam system was an example of individual parallel unit supply.

And why could not an electric light system duplicate these public utilities. That's what Edison, after pondering over the limitations of the arc light, asked himself. So, contrary to current opinion, and in the face of violent criticism and ridicule, he set himself the task of creating an incandescent lamp whose resistance, current consumption, life and cost would make its unit use commercially possible, which result, regardless of the original and contemporaneous work of other inventors, among whom Swan and Weston should particularly be mentioned, he first achieved after untiring and ingenious experiments and research. So in October, 1879, the period of gestation ended, and Edison by a Caesarian operation brought into being the incandescent carbon lamp.

THEN came the expansion of the individual parallel circuit into a net work, supplied at different points by feeders extending from a battery of high-resistance shunt field dynamos, either belted to or driven directly by high-speed engines, and a host of detail developments essential to general use, in which he had the active cooperation of such men as Kruesi, Stieringer and Bergmann.

But even with a station located, as at first, in the center of a district, the practical limit of potential reached in lamp manufacture remained an economic handicap. So to get the advantage of a higher electrical pressure, and thus materially increase, with reduced cost of copper, the area of distribution, there was proposed by Edison here, and independently by Dr. John Hopkinson in England, the 3-wire system, really a multiple-series grouping of lamps, supplied by dynamos in series, with a grounded balance wire between the juncture of dynamos and the lamp groups, this grounding, however, limiting the expansion of the system to a higher combination.

This was first put in use with overhead conductors in Sunbury, and later on the underground system in Brockton. Then came the rapid expansion of Edison central stations, the earlier companies being designated "Lighting" or "Illuminating," for until the spring of 1885, when the Sprague motor was officially adopted by the Edison Company, lighting was the principal objective. This period would seem to have marked the peak—but what a high one!—of the distinctive Edison system and his individual contributions thereto.

Then came the advent in the United States of the polyphase alternating current system, under the aegis of Mr. Westinghouse, following earlier European developments, with its marvelous capacity of inverse variations of potential and current and consequent possibilities of long distance high-tension transmission, and the attendant commercial rivalries of the Edison and Westinghouse interests in a so-called "battle of systems," and monopolistic effort. In 1886, I had, in a private report, without avail urged upon the former the combination of these two developments. This system, too, had to go through its initial trials, but thanks to many devoted workers, among them Stanley, Thomson, Tesla, Bradley, Challenberger, Lamme, Steinmetz and others in this country and abroad, various serious difficulties were finally surmounted.

Then came the era of electric traction, whose commercial birth took place at Richmond, this followed by the multiple, unit train-control development, these declared by Dr. Huber-Stockar the modern milestones, and now by an increasing activity in main-line equipment, of vital import to general power supply systems—but this is another story.

THE correlation of the direct and alternating current systems has made possible the great modern power distributing plants, by which the area which may be supplied from a common source, either directly or through substations, has been increased a hundred-thousand fold; and instead of a multiplicity of independent limited central stations, any number may now be coupled together to form a country-wide network of supply for every purpose for which electricity may be used in the universal service of man.

Today the tungsten metal filament, as developed by Coolidge, and the new gas lamps have doomed the carbon lamp, great polyphase alternators of from 150,000 to 200,000 hp., driven by high-speed steam or water turbines, are displacing the older type, and the direct current itself faces a formidable rival in industrial applications, but back of it all, and more responsible than any other in early stimulating effort, is Edison's original brilliant work and conception.

On it has been built up, by thousands of workers and in a myraid of ways, aided by university training, business acumen, unlimited capital and exhaustive research, the solid structure of which the N. E. L. A. is one of the greatest representatives.

THOMAS ALVA EDISON

A SYMPOSIUM

By M. H. AYLESWORTH

National Broadcasting Company

WHEN the ceremonies celebrating Light's Golden Jubilee are held Oct. 21, they will be heard around the world by means of a medium which owes much to Thomas Alva Edison, central figure in the world's electrical development.

So diversified are the talents of this man, so great are the contributions that he has made in the realms of science and invention, that his early work in production of the microphone are frequently obscured. Radio, quite recent among mechanical marvels, centers on the microphone, and progress in broadcasting has been made in the measure of perfection of the microphone.

Radio will carry to listeners, not only in the United States, but into every continent on the globe, the messages of good will which America will give to Thomas Edison. Truly, this is the drama of life.

By R. H. BALLARD

Southern California Edison Company

THAT note of optimism which always has characterized the electrical industry of America is due, in no small measure, to the career of Mr. Edison. Here is an industry which was founded on vision, nourished on courage and which now, as ever, looks forward with full confidence toward the future, knowing that Mr. Edison and those others whose lives are dedicated to the work he established will have the ability to meet every obstacle that is encountered. No Golden Jubilee has ever been so permeated with the spirit of youth as that now being celebrated to commemorate the first incandescent lamp. It is no coincidence that the world's most notable progress has occurred during the half century which began on October 21, 1879.

By N. F. BRADY

New York Edison Company

UNDER the light of an electric lamp (invented by Edison) we may write a message to be sent to the ends of the earth for a reasonable sum—thanks to Edison; listen over the telephone to the voice of a far-away friend—thanks to Edison; read the news or stock quotations on the ticker—thanks to Edison; hear on a phonograph the voice of Caruso or Melba—thanks to Edison; or go about our daily tasks, made easy by the sub-division of electric current, from toasting the morning's bread and preparing the coffee to riding in elevators, street cars or subway to our work, again made light by electric fan or heater, according to the season—thanks to Edison. To him—long life and happiness here below, and hereafter the reward of a life well spent.

By HENRY G. BRADLEE

Stone & Webster, Inc.

EDISON'S patient, persistent, and unremitting research has largely contributed in establishing the mileposts of civilization's marvelous progress of the last half century. To me he is unique and is aptly described by the words of Emerson which follow, "The power which resides in him is new in nature, and none but he knows what that is which he can do, nor does he know until he has tried."

By B. C. COBB

Allied Power & Light Corporation

TO say that Thomas A. Edison is a genius seems superfluous. To say that we admire, respect and love him for the wonderful things he has done for humanity, I think is more fitting and a comment that Mr. Edison himself would prize more highly.

By J. E. DAVIDSON

Nebraska Power Company

FROM the time of my boyhood days in Port Huron, Michigan, I have idolized Thomas Edison—for it was there that he spent many years of his life. And it was in Port Huron where I took up an apprenticeship in the electric industry, one of my first jobs being the reading of the meter of his sister's home. Now, as his photograph hangs on the wall of my office, autographed by his own very hand, I am stirred to think that it is the very same mind and hand that has produced so much in human advancement and benefaction; the same skillful hand that brought forth the incandescent lamp which has meant so much to everyone everywhere. Thomas A. Edison's works mean to me a greater inspiration in activities of our industry, to be of greater service to mankind.

By FRANK L. DAME

The North American Company

IT is a privilege to join in the tribute to Thomas A. Edison, personally because of my long connection with the industry that owes so much to him, and also in behalf of the stockholders of The North American Company, which had the honor of association with Mr. Edison during the first year of the company's existence nearly forty years ago.

During the period from June 1 to Oct. 21, 1929, while the world is celebrating Light's Golden Jubilee, The North American Company—on June 14, 1929—entered its fortieth year. These circumstances are especially significant to me because The North American Company prizes among its records an original counterpart of the contract of Oct. 1, 1890, to which Mr. Edison, The North American Company and the Edison General Electric Company were parties, providing for "the application of electricity as a motive power to railways of all descriptions and to important improvements in connection with the use and application of electric power."

It was with a feeling of pride, and recognition of what Mr. Edison means to the light and power industry, that we recently reproduced the signatory page of that contract, together with a published review of the Annual Reports to the Stockholders of The North American Company since its organization in 1890, and presented these historical records in pamphlet form to the many thousand stockholders of our company.

By HENRY L. DOHERTY

Henry L. Doherty & Company

MANY men have physical courage; some men have moral courage, and sometimes as the centuries roll by we find a man who has both intellect and intellectual courage. Thomas A. Edison is to me the greatest example of this latter type. He not only had intellect, but he had the intellectual courage to live his own life according to the pattern he found in his own brain.

By CHARLES L. EDGAR

Edison Electric Illuminating Company of Boston

THE electrical industry is the true monument to Edison. The genius of this modest man has enabled our industry to bear his standard before the entire world and to shed light and comfort upon the pathway of human progress.

Those of us who have been associated with him from the beginning find it difficult to express in ordinary language our feeling of profound veneration for him. Those who have not been so associated have, I believe, missed a great experience. All of us in our great industry have enshrined deep in our hearts the satisfaction of being able to live and work under the inspiration of Thomas Alva Edison.

By CHARLES E. ESTABROOK

Edison Pioneers

I CANNOT allow "Light's Golden Jubilee" to pass without paying a tribute to Mr. Edison. He means to me almost my whole business life. He has always been to me an inspiration to do better things. As an Edison Pioneer, we consider him "The Pioneer" to whom we owe the comforts of life.

By JOHN F. GILCHRIST

Commonwealth Edison Company

THE little building in which the Chicago Edison Company began its central station business was so arranged that the employees of the dynamo, switch board and meter rooms could reach their work only by passing through the principal executive offices or through the boiler room and alley. Before and after office hours the first entrance could be used, if your feet were clean. During office hours there was no choice.

One evening, after office hours, in 1889 the writer, on opening the door from the Board room to the dynamo room, found the Board room occupied by a group of distinguished-looking men, who, he afterwards learned, were Directors of the Edison Company, standing around a flat top desk, at which was seated a large man with a smooth, boyish-looking face. Mr. Edison, who he proved to be, had, through the influence of Samuel Insull, then vice-president of the Edison General Electric Company, come out to look over the Chicago situation. The table was entirely covered by a piece of manila drawing paper. With a pencil Mr. Edison was rapidly sketching the distribution system of the future as he saw it, a generating station on railroad tracks, with ample condensing water, transmission lines, substations and local distribution lines—what has proved to have been a perfect picture of today's methods, although at that time such a plan was an absolutely new thought, and I do not think there was an electrical substation in existence anywhere.

The directors of the Edison Company were so absorbed in Mr. Edison's picture that no one paid any attention to the young meter boy, and he had an excellent opportunity to observe the plan, but more particularly to observe the man.

The same clear, simple foresight that was the outstanding feature of the scene mentioned above has characterized Mr. Edison's work and is typical of the simplicity, the genuineness, the keen insight and the rugged, common sense of the man, who with his untiring work and perseverance, has been the greatest inspiration of the men in the electrical industry.

By FRANKLIN T. GRIFFITH

Portland Electric Power Company

EDISON, the scientific pioneer, has, for fifty years, been an inspiration to the steadily growing army of men and women devoting their lives to the further development and utilization of the product of his genius. In the history of mankind, while still living, he occupies a position of preeminence that can only be heightened and glorified by the appreciation of countless generations yet unborn.

THOMAS ALVA EDISON

A SYMPOSIUM

By C. E. GROESBECK

Electric Bond and Share Company

THE electric industry has been built upon Edison's discoveries. No other industry owes its inspiration and progress so completely and overwhelmingly to the outstanding genius of one man.

Edison blazed the trail not only through his inventions, but also through their application to everyday life. The world is as much in debt to Edison for working out the complicated details of the first commercial electric light system as for his discovery of the incandescent lamp.

Basically, the methods of supplying light and power to the public are the same today in the modern electric system as those which he developed in the old Pearl Street plant.

Furthermore, the work of electrifying the United States has to a large extent fallen upon the shoulders of men who were trained by Edison in the pioneer days, and today many of these men are still active in the development of the industry.

It is no exaggeration to say that, considering the contribution which electricity has made to mass production in the factory as well as to the comforts and conveniences of the home, Thomas Edison, directly and indirectly, has done more to raise standards of living throughout the world than any other man since history began.

By FRANCIS JEHL

Edison Pioneers

THOSE who were gathered around him in the old Menlo Park laboratory enjoyed his confidence, and he theirs. Nor was this confidence ever abused. He was respected with a respect which only great men can obtain, and he never showed by any word or act that he was their employer in a sense that would hurt the feelings, as is often the case in the ordinary course of business life. He conversed, argued, and disputed with us all, as if he were a colleague on the same footing. It was his winning ways and manners that attached us all so loyally to his side, and made us ever ready with a boundless devotion to execute any request or desire.

To this I wish to add, in the words of my good departed friend, T. C. Martin, "Thus does a great magnet, run through a heap of sand and filings, exert its lines of force and attract irresistibly to itself the iron and steel particles that are its affinity, and having sifted them out, leaving the useless dust behind, hold them to itself with responsive tenacity."

By T. A. KENNEY

Allied Power & Light Corporation

WE are indebted to Mr. Edison for his great foresight and courage in the development of the electrical industry and for his guidance and inspiration to every one connected with it.

By THOMAS N. MCCARTER

Public Service Electric and Gas Company

WE of the electric light and power industry owe to Thomas A. Edison the very basis of our industry. By the magic of his mentality he converted scientific speculation into practical accomplishment and showed the way to tremendous advancement in the economic and social life of the nation.

By JOHN B. MILLER

Southern California Edison Company

MR. EDISON'S middle name should have been "Alpha" instead of "Alva," for it is to his genius that we owe the beginning of our industry. I do not think there will ever be an "Omega."

Born and brought up in Port Huron, the son of an old school and playmate of Mr. Edison's, his name has always been a household word in our family and, to me, an example of what genius, coupled with imagination and perserverance, can accomplish.

By JOHN J. O'BRIEN

H. M. Byllesby & Company

THE inspiration of Thomas A. Edison's personality has been so much a part of the daily life of workers in the electrical industry that it is exceedingly difficult to express its full power and meaning. It is almost as though Edison and electricity were one and the same. Since boyhood the name "Edison" has possessed for me the significance of unmeasurable vitality, closely affecting the lives of myself and associates.

I believe that I can relate an incident which shows the bigness of Edison and his kindly and helpful nature better than anything I have ever read or heard.

In January, 1912, the tenth anniversary of the Byllesby organization was celebrated by a splendid banquet at the Congress Hotel in Chicago. As a tribute to Colonel Byllesby personally and his business success, many leaders of finance and industry accepted his invitation to attend. It was a gathering of distinguished men and our own young organization, and the chief guest of honor was Thomas A. Edison. Alongside Mr. Edison sat such men as Charles A. Coffin, Samuel Insull, Charles G. Dawes, George M. Reynolds and Victor Lawson, to mention only a few.

To understand Mr. Edison's presence it is necessary to recall that this was the first and last time he visited Chicago or the Middle West since the Chicago World's Fair in 1893. Seventeen years ago he was then far from a young man. A trip to Chicago in the dead of winter—and it was decidedly sub-zero temperature—meant to him a serious sacrifice in time and comfort, and some peril to health.

THOMAS ALVA EDISON

A SYMPOSIUM

And yet he came to honor one who, as a young man, had worked for and with him in the early days of the industry, and his presence went far to make the affair one of the most notable of the kind ever held in Chicago.

No one at this gathering was more simple, unassuming and friendly than Mr. Edison. After the dinner he sat for an hour or more autographing menu cards and exchanging pleasantries with old and new acquaintances. I recall that Mr. Samuel Insull thought he should get Mr. Edison safely tucked away at the Blackstone Hotel, and Mr. Edison, looking up from making his signature and saying, "Don't hurry me, Sammy. I'm all right and I want to please these boys."

When he offered a toast to Mr. Edison, Colonel Byllesby said:

"Thirty years and about eight months ago, as a mere stripling, or mere striplings, Mr. Insull and myself entered the electrical industry in subordinate capacities under Thomas A. Edison. I will not take up your time; it would be idle, it would be foolish to repeat the achievements which have written Mr. Edison's name high on the scroll of the immortals. I can only say that every one of us engaged in this business primarily have bottomed our success upon the wonderful achievements of this wonderful man. I do not attempt to pay tribute this evening to the genius of Mr. Edison. In the words of Huxley, 'that was merely a happy accident of birth,' but what I do pay tribute to is the never-faltering faith, the energy, the industry which developed that God-given gift into the marvelous results which we see today. To Mr. Edison, in common with every worker in this field, I owe a debt of gratitude."

Mr. Insull responded for Mr. Edison in a splendid speech, in the course of which he said:

"I asked Mr. Edison to write down some message to the young men here, and I will read it to you. It is in his own handwriting. He said: 'When you get a job, pitch in, pay no attention to time. Get more interested in the business than the old man himself. Think of nothing and talk of nothing but shop. Then when you want to leave to better yourself, the old man won't let you. He'll raise your salary or take you in as a partner.' "

I have always thought that it was particularly fine of Mr. Edison to attend our celebration. His presence encouraged and stimulated us greatly. He made a living force completely human to our organization. Edison to me, and the whole Byllesby organization, means far more than I have the power to put into words. I am glad indeed that I have this opportunity to acknowledge the wonderful, personal manner in which he inspired us more than seventeen years ago. The world is his debtor, and none more than we.

* * *

By J. F. OWENS

Oklahoma Gas & Electric Company

TO me Edison is the spirit of America incarnate. He typifies that individual enterprise and daring which has resulted in the conquering of a wilderness, the taming of streams, and the reclamation of desert wastes. He dared venture into the unknown—to think new thoughts and to seek out the solution of the riddle of Nature's laws.

He is a product of the philosophy so well expressed in the Constitution of the United States as conceived by its makers, that a nation can be no more than the sum total of the hopes, aspirations and ambitions of the individuals who are its citizens.

No other theory could have resulted in the absorption of men and women of every race and background and their welding into a unified people. America and American philosophy of goverment has made Edison and his work possible, and he in return has given back to the world a thousand fold because he has lived. Men and women of every race and clime have today greater comforts, greater opportunities and larger lives.

It is a fearsome thought to contemplate the possible effect of movements, indorsed and championed by well meaning but misguided individuals who would, to further a cause, perhaps in itself worthy, supplant the individualistic theory of government that has made Edison and his work possible, with a paternalistic government that would direct instead of respond.

Are we as individuals to become learners rather than leaders? Are we to look to Washington for our thoughts rather than further those whom we delegate to carry out our wishes, with facts and ideas as the basis upon which their course may be shaped? Are we to delegate our rights and our God giving talents to bureaus and commissions? Shall we forget that progress of the human race must be through the development of the individual, and slow though it may be and impatient as we may become at its slowness, may we not realize that no other method can make for lasting betterment?

It is well, as we celebrate the fiftieth anniversary of Edison's greatest achievement, to ponder on whither we are drifting, or have we gone too far in shifting our responsibilities; have bureaus become so entrenched, so enmeshed in politics that we cannot take back to ourselves the rights that are ours under the Constitution?

Are we too indifferent to the tendencies of the time to take warning from the history of other republics just as full of promise in their early days as ours, or are we too lazy to care? What of our children and our children's children? What shall we pass on to them, I wonder?

* * *

By R. F. PACK

Northern States Power Company

IT has been said that we Americans are dollar worshippers. The life of Thomas A. Edison and the place he holds in the hearts of the American people, and indeed throughout the civilized world, is a substantial refutation of this charge. There are few of us, his fellow countrymen, who know whether he is rich or poor. We never have been interested in that phase of Mr. Edison's life. That which commands our interest, our admiration, and indeed our love, is the man himself and the contribution he has made toward the building of a better civilization. His fertile mind, his inexhaustible industry, have made this an immeasurably better and more comfortable world in which to live. He will leave us a heritage of infinitely more value than anything the greatest of fortunes could provide. He is more than a leader, more than the outstanding figure of a great industry—he is a world figure. His contributions to the advancement of science command the respect and gratitude of the entire civilized world. In addition, he is a hero and an inspiration to every American boy. He constitutes an enduring idol—one of the few of human clay whose lives and achievements have kept him always foremost in the esteem of his fellow men.

By HARRY REID

National Electric Power Company

THE past fifty years has brought greater progress in daily life than the entire previous history of civilization. Who but Edison has been the leader in this great social change? Few men have changed, or will change, the world, as Edison. By pondering his accomplishments, we can the better appreciate that great thing called "Progress." Such pondering leaves us amazed. Amazed that any one man could do even a part of what Edison has done.

By A. W. ROBERTSON

Westinghouse Electric & Manufacturing Company

FIFTY years ago Thomas A. Edison produced a practical incandescent lamp. Today the direct and indirect outgrowth of that invention, the electric light and power industry, represents an investment of ten billions of dollars.

To me the most significant fact in this great development is not the creative genius of Edison, whose wizardry of invention stands unparalleled, but rather the man himself. His integrity, patience, industry and practicality are symbolic of this great industry.

Many men of the sound progressive vision of Edison have identified themselves with the electrical industry and have created for it a sound public confidence, until today the securties of the electric light and power companies are owned by the citizens of every state in our country.

This assurance, in the minds of the great general public, of the soundness of the industry has been largely responsible for its remarkable growth, and for this confidence the industry owes a great debt to Mr. Edison and to those other outstanding figures associated with him in the founding and growth of the industry.

By MARSHALL E. SAMPSELL

Central Illinois Public Service Company

TO Thomas A. Edison more than to any one man, or group of men, is due our marvelous transition from primitive days into an era of ever-increasing growth and expansion of industry, business, transportation and communication. He has made it possible for us to translate the dreams of our electrical industry into time and labor-saving realities.

By PAUL E. SCHOELLKOPF

Niagara Falls Power Company

IN this age of mass production, one marvels all the more at the human accomplishments of Mr. Edison. Among so many benefits to mankind, through his personal efforts, he virtually made possible the electric service of today. Pioneers closeiy associated with him in those earliest days, carrying with them his inspiration, are today among the greatest leaders of the central station industry. To me he is the personification of human accomplishment and the desire to serve.

By FRANK W. SMITH

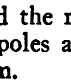
United Electric Light and Power Company

TO one who has been continuously identified with the electric lighting business from its beginning—back in the days of series arc lighting and through the development of the alternating current system from its early stages of operation from overhead mains, the outstanding accomplishment of Mr. Edison has always seemed to me to be his conception of a complete electric lighting system from generating station to the customer's premises by means of underground distributing mains. In the writer's opinion, no other accomplishment emphasizes so thoroughly and completely the genius and foresight of the great inventor as this fact.

The incandescent lamp, important as was its perfection by Edison, was but one element of this complete system. With no guiding precedents, he conceived and built a system that involved the complete design and construction of many of its component parts. Edison had uncanny vision to conceive a system at the outset—in his pioneer days—that would remove for all time the trouble and worries and operating difficulties inherent in an overhead system in great metropolitan areas. Edison was free from the long drawn out litigation that preceded the removal in the large metropolitan areas of overhead poles and wires and the introduction of underground system.

Light's Golden Jubilee is a nation-wide tribute to the monarch of an industry, the existence of which has been made possible by the wonderful visualization during those early pioneer days fifty years ago, shortly after the termination of the Civil War, of this great American, Thomas Alva Edison.

May we, of the industry, be privileged to have him with us on the centenary of his existence and to pay him the further homage that will be due him for the achievements which will be his over another score of useful years.



By ELMER A. SPERRY

Sperry Development Company

THOSE of us who had the privilege of years of work under the leadership of Thomas A. Edison as Chairman of the Naval Consulting Board were afforded a unique opportunity for contact that we shall never forget, and for which we can never be too thankful. At times the breadth of his grasp of a situation was nothing short of startling and gave us a glimpse into the brilliance of his insight and his versatility in the solution of difficult problems and situations.

By PROFESSOR ELIHU THOMSON

General Electric Company

IT gives me great pleasure to testify to the inestimably great influence Edison's development of the incandescent type of electric lamp had in the pioneer days of the application of electricity in illumination. Though preceded by many instances of lighting by electric arc lamps here and abroad, he had the courage to follow to commercial success his early efforts in establishing incandescense in its true relation to the infant industry; namely, distribution by small lighting units replacing a gas light. Not only that, he built up a great system of generation, distribution by multiple arc, and provided the essentials of switch sockets, fuses and potential regulation, surviving today even though the lamp itself has gone over from carbon to tungsten wire.

But above all, Edison has been the typical great inventor, whose energy and versatility have not been confined to one field. As examples, it is only necessary to mention the variable resistance transmitter for telephonic use, the phonograph, moving pictures, and many inventions of world-wide application.

By FRANK A. WARDLAW

Edison Pioneers

NEARLY half a century has passed since it was my proud privilege to have been associated with Mr. Edison, with countless opportunities during the intervening years to have become familiar with all he has done for the advancement of science, his benefactions to industry, and the alleviation of human drudgery. During those years it was also a privilege to have become familiar with the personal side of his nature; all these cherished contacts but accentuating a prior conviction that to him is due a greater measure of indebtedness for the human progress of today than to any other living man, and one for which the world should ever be grateful.

By EDWIN R. WEEKS

Weeks & Kendall

KANSAS CITY, MO., regards as its greatest treasures one of the first dynamos made by Edison, with which, in the early 80's, I operated the first Edison lamps in the city, and one of Mr. Edison's first phonographs and the original cylinder bearing his voice to an audience of thousands during the National Electric Light Association Convention here in February, 1890. They are among the hundreds of wonderful inventions which have filled the life of one of the world's greatest men and by far its greatest inventor, Thomas A. Edison.

By WALTER F. WELLS

Brooklyn Edison Company

EDISON caused me to give up my youthful desire to become a locomotive engineer and inspired me to prepare for a life in the electrical industry.

The business he initiated provided an opportunity in which to develop my talents and assist in the development of the talents of thousands of my co-workers in an industry which is rendering a highly appreciated public service to the residences, stores and factories of our city, and which affords the worker a fair compensation for his endeavors and earns for the security-holders a fair return on the capital invested.

By OWEN D. YOUNG

General Electric Company

EDISON is the personification of the industry. A vision of a great service to be performed; a faith that it could be done. Unremitting toil, unexampled ingenuity; persistence and patience, finally crowned with accomplishment. Work, work, work! May the industry always carry on.

By JOHN E. ZIMMERMANN

United Gas Improvement Company

GREATER than his contribution to the science of electricity are the benefits which Mr. Edison has conferred upon the social life of the nation. The electric industry, inspired by his genius, has largely removed the burden from men's backs to the machine, and has set in motion a movement of population from the larger cities to the smaller centers and rural communities, where men and women can own their own homes, and enjoy better social conditions and live a freer life. His greatest social contribution has been in relieving the womanhood of the country of the drudgery of domestic life.

From Many Viewpoints

HOW significant the living presence of Thomas A. Edison is in the United States and how vast and intimate are his works in the life of the country is brought out with impressive lucidity by expressions of appreciation voiced by members of the General Committee for Light's Golden Jubilee.

From these various representatives of the nation's economic, educational, religious, sociological, military and political life, have come keen estimations of the meaning of the great genius to the country.

They range from analysis of specific benefits of the electric incandescent lamp to broad appraisals of not only all the inventive achievements of Mr. Edison, but also the intangible, though nevertheless, recognized influence of his exemplary and inspiring career.

MISS JANE ADDAMS

Jane Addams, as an authority and writer on social reform, sees the electric light as a powerful force in that phase of life in which her energies are engaged. She views it as a moral force, rounding out city life more completely by making possible modern recreational facilities.

This is her estimation of the meaning of the inventor's achievement:

"Mr. Edison's perfection of the incandescent lamp affords perhaps the world's most striking example of the manner in which moral progress from time to time has been so suddenly promoted by the inventor as to leave the professional moralist gasping in amazement. Certainly the new urban recreation so dependent upon parks, community centers and municipal beaches, with its high educational value, would have been quite impossible without the safeguard and the charm of the lights whose golden jubilee we are now celebrating."

GEN. ROBERT LEE BULLARD

With military terseness and accuracy, General Robert Lee Bullard gives this eulogy on Mr. Edison and his electric lamp:

"A new and mighty impulse—perhaps the mightest ever—to the advance of civilization.

"Light's Golden Jubilee, as I see it, is more than a tribute to a great inventor. To me it has a deeper significance than that of celebrating the fiftieth anniversary of Edison's incandescent lamp. It is making an otherwise preoccupied world open its eyes to the progress it has made during the past half-century, and to realize what changes have been wrought within the comparatively brief span of fifty years."

WALTER P. CHRYSLER

Walter P. Chrysler, of the Chrysler Corporation, in an analysis balancing the benefits of Mr. Edison's inventions against the example of the man's life finds the scales of his judgment weighed in favor of Mr. Edison's stimulating influence.

"Light's Golden Jubilee," he said, "as originally conceived, centered around the electric lamp Edison invented fifty years ago, but the movement has spontaneously taken on a much broader character. Though the lamp may be Edison's greatest invention, and though it has been of incalculable benefit to hundreds of millions, nevertheless, the man himself is greater than any material thing he ever put together, and the example of his life has a higher value for society than any of his accomplishments.

"Service to humanity, is the ideal of our modern civilization, and it is because Thomas Alva Edison perfectly personifies this ideal, that people in all walks of life and everywhere in the world are enthusiastically anxious to participate in the jubilee."

PAUL D. CRAVATH

Tersely, Paul D. Cravath gives his description:

"The signal achievement of Thomas A. Edison in inventing the incandescent lamp, whose fiftieth anniversary we are celebrating this year in Light's Golden Jubilee, is one of the greatest factors in the world as we know it today, both as regards the home and business life of every individual."

JOHN W. DAVIS

John W. Davis, in an impressive eulogy, adds to the tribute with this statement:

"What a debt of gratitude we owe to the Sage of Menlo Park! He literally brought the world out of darkness into light. It is utterly impossible to compute the benefits from this invention. Certainly its influence on modern life has been broader than that of any other.

"Goethe, no matter how his dying request for 'more light' may be interpreted, could not have contemplated such a fulfillment."

GEORGE EASTMAN

George Eastman, inventor of the Kodak, and chairman of the Board of Directors of the Eastman Kodak Company, doubts the ability of any individual to estimate the entire meaning of the incandescent lamp.

Not only as an achievement in itself, does he recognize the light as an outstanding invention, but because of its stimulus to other inventors and increased production of methods and machines in manufacturing.

"I do not believe that any one man can estimate the full significance of the fiftieth anniversary of Mr. Edison's incandescent lamp," is his assertion. "In my business the electric light has been used since 1882 when the Edison Company installed one of its first plants in our laboratory in Rochester.

"This system of lighting was used when film photography was invented and perfected two years later. During the past half century the electric light has contributed to the creation of more new products and manufacturing processes than any other single utility.

"But the significance of this anniversary does not rest entirely on what has been done. No one can predict what scientists will accomplish during the next half century, but the contrasts between today and the future will be as great or even greater than they are between 1879 and 1929.

"One fact, however, will always be recognized. Mr. Edison is the pioneer in the world system of electrical illumination."

GOVERNOR FRED W. GREEN

Speaking his personal opinion, as well as in behalf of the State of Michigan, where Light's Golden Jubilee will culminate Oct. 21, at Dearborn, Governor Fred W. Green contributes an impressive statement to the list of encomiums.

"The citizens of Michigan are most happy to join with our nation in paying homage to the world benefactor, Thomas A. Edison, by commemorating the fiftieth anniversary of his perfection of the incandescent lamp," he stated.

"Michigan is the scene of his early activities as a newsboy and is where he later gave first thought and attention to the handling of electricity. It was here that the foundation was laid and the inspiration gained for his later accomplishments.

"Our State is especially active in this nation-wide movement and has an unusual part in this tribute through the activities of Henry Ford in completely restoring at Dearborn the Menlo Park Laboratories where Mr. Edison perfected the electric light. Here will be established not only a record of the life and inventions of Mr. Edison, but also a collection of his original tools and reports.

"In Mr. Edison we have a national and industrial hero, a man who in addition to his many achievements is possessed of the highest type of character of which we are all proud. It is a pleasure and a privilege to pay tribute to him for what he is, and for what he has accomplished."

WILLIAM GREEN

The widespread benefits that electric light has brought to the world is pointed out interestingly and with marked effect, coming as it does from William Green, president of the American Federation of Labor.

"The Old Record tells us that in the beginning the creation of light preceded the coming of man. Light is such a primary factor in human life that we are accustomed to use the term in speaking of spiritual things as well as physical. Customs and civilization itself adapt themselves to control of light," he said.

"To Thomas A. Edison who gave us greater control of artificial light, we owe many of the comforts and opportunities of modern life. Mr. Edison's lamp has brought new control over time that not only serves work, but has also broadened the possibility for leisure and recreation for all who work.

"On behalf of those who work as wage earners, I am glad to pay tribute to the betterment Mr. Edison's genius has brought into our daily lives."

THE DOCTORS MAYO

The significance of Mr. Edison to the country as the inspiration of many other scientific advances through his pioneer work in electricity is stressed by Dr. Charles Horace Mayo and Dr. William James Mayo. They both made this statement:

"America may well pride itself on the marvelous advances in industry and commerce which in one generation have led to the prosperity of all the people, and on those advances in medicine which have prolonged the average lifetime of man more than eighteen years. It has been well said that very great human advancement has been the prolonged shadow of one man. The great achievement of Mr. Thomas Alva Edison in perfecting the incandescent lamp has lifted mankind from darkness into light, and has initiated a wonderful series of events which have been connected with the phenomenon which is known as electricity. It is a privilege to join in a tribute to Mr. Edison on the fiftieth anniversary of his invaluable gift to the world."

PROFESSOR EDWARD L. NICHOLS

With the calm and sincere vocabulary of the scientist, Professor Edward L. Nichols, Professor Emeritus of Physics at Cornell University, expresses his feeling toward the meaning of Light's Golden Jubilee. He was with Mr. Edison at Menlo Park from 1880 to 1881.

"An appropriate commemoration of an outstanding and notable development," he stated.

HENRY FAIRFIELD OSBORN

Henry Fairfield Osborn, in a message directed to Mr. Edison, gives an interesting angle to his praise of the inventor:

"It is a privilege to know you in person and to share with the world in messages of honor and esteem.

"Fiat Lux, let there be light all over the world, and there has been light for fifty years, replacing in the hours of darkness from pole to pole the Sun, which came with the first *Fiat Lux.*

"You may not recall a remark you made to me at George Eastman's last spring. You said, 'You are interested in the great past, Eastman is interested in the great present. I am interested in the great future!'

"May your future be as happy and fruitful as Eastman's present and Osborn's past."

GENERAL JOHN J. PERSHING

The appropriateness of paying tribute to Mr. Edison while he lives is emphasized by a man famed in a service whose members are rarely honored until after death. There is a strong touch in the writing of General John J. Pershing's statement.

"There is no question that Mr. Edison's development of the incandescent lamp has brought a greater measure of happiness, contentment, advancement and benefit to humanity than any other single discovery," said General Pershing. "When we think that it has penetrated to every quarter of the globe and has carried to benighted peoples what may be well called 'the light of the world,' then, and only then, can its importance be fully appreciated. It is entirely fitting that his accomplishment should be fully recognized by mankind while he still remains among us."

MICHAEL PUPIN

What the significance of Mr. Edison and his works is in the field of science is described by Michael I. Pupin. He said:

"Light's Golden Jubilee is a fitting occasion to say a few words about Thomas Alva Edison's great achievement in the perfection of the incandescent lamp.

"A noted wit described once Mr. Edison's greatest achievement in the following three words—*'Filament in vacuo.'*

"But a whole book could be written about the vast amount of work which Mr. Edison and his assistants had to perform in order to get the right kind of filament and the right kind of vacuum.

"The noted wit, who succeeded in formulating the shortest description, omitted to mention a very essential element in Mr. Edison's electrical lighting system. This element represents another epoch-making achievement. It is the invention and development of the low resistance dynamo-electric machine which fed the incandescent lamps, all connected in parallel. This invention, added to the perfected incandescent lamp, gave us the incandescent lighting of today.

"The incandescent lamp, therefore, together with Mr. Edison's power distribution system between circuits connected in parallel, is Mr. Edison's great achievement which we are celebrating in Light's Golden Jubilee."

JOHN D. ROCKEFELLER, JR.

John D. Rockefeller, Jr., views the celebration of the anniversary as an occasion for counting the blessings which the invention has bestowed upon mankind.

"Thomas A. Edison's invention of the incandescent lamp fifty years ago was much more than a scientific invention. It was the beginning of a new era in electricity, a natural force having infinite possibilities of usefulness was to be harnessed by man and made to serve him in countless ways. This celebration of Light's Golden Jubilee leaves us to reflect upon the blessings which the electric light has brought to millions upon millions of people throughout the world."

DOCTOR STEPHEN S. WISE

From Dr. Stephen S. Wise comes this encomium:

"Servant of Light!—what high and honoring title. Light bringer—such is Thomas A. Edison—yea, even fashioner and creator of Light! Men rise up and call him blessed—who hath rendered services immeasurable to humankind."

A Human Sort of Person

By AMPLIFIER

I SOMETIMES wonder if, in all of the enthusiasm over this splendid national and international celebration known as "Light's Golden Jubilee" in honor of Thomas A. Edison, there is not a tendency to create a symbol out of a living man which, instead of bringing him closer to the American people for whom he has done so much, may make him more remote and cause the public at large to forget that, after all, he is a very human sort of person as those who have been associated with him for many years have testified again and again.

There also seems to be some inclination to consider the celebration as a matter belonging peculiarly to the light and power industry because of the fact that 1929, being the fiftieth anniversary of the first practical incandescent lamp and the laying of the corner stone of that industry; has been tagged Light's Golden Jubilee. But it is something more than that, and I am quite certain that the leaders of the industry, particularly that group known as the Edison Pioneers, would be the first to agree. It is, in the first instance, a celebration in honor of a very great American citizen—a man who has made a greater contribution to the advancement of the social, economic and industrial life of the whole world than any other one individual, but one who, I suspect, likes to be treated as a human being rather than as some sort of a monument set up as an example of what an American citizen can do.

IN this connection, the most charming note which has been struck among all the many things which have been said about Mr. Edison during the past few months will be found in an address by Charles L. Edgar, president of the Edison Electric Illuminating Company of Boston, delivered on Edison Day at the 52nd convention of the National Electric Light Association. Speaking on the Inspiration of a Name, Mr. Edgar said:

"While we have been amazed at the volume of his achievements, and spellbound by his energy and perseverance, we have been especially touched by the warmth of his affection. Though he may be acclaimed a leading scientist and inventor, though he may be pointed out as the highest type of American citizen, those of us who know him best will ever proclaim him, above all, a staunch and faithful friend. Always modest and of a retiring nature, he has not desired fame or honors, although his fellow men have praised him for his integrity of character, have honored him for his achievements, and loved him for his self-sacrificing regard for others."

His regard for others, and particularly for his associates, has characterized Mr. Edison's whole life. To him they have always been his boys—his pals. To them he has been "the old man." Quick to give credit for the assistance they may have given him in his work, it probably has never occurred to him to seek credit for himself. Intolerant of laziness, he has always been tolerant of failure if it were an honest failure, for much of his work has been based on the system of trial and failure.

TO get a real picture of Mr. Edison from his earliest childhood to the present time, one need only to turn to the new edition of "Edison—His Life and Inventions," which has just been published by Harper & Brothers. While presumably by Frank Lewis Dyer and the late Thomas Commerford Martin with the collaboration of William Henry Meadowcroft, long associated with Mr. Edison, it is a fascinating mixture of biography and autobiography, for much of the story is told in Edison's own words and, in fact, much of the manuscript was furnished in his own handwriting.

As a boy in public school Edison was not a success. In fact, his mother became very indignant on hearing that his teacher had referred to him as being "addled." She, herself, was a highly educated woman with long experience as a teacher and most of his education came from her. It seems that he had most of the ordinary experiences of a lively and intelligent boy. He fell into a canal and was nearly drowned. He fell into a pile of wheat in a grain elevator and was nearly smothered. Holding a skate strap for another boy to shorten with an axe, he lost the tip of a finger. He built a fire in a barn, but the flames spread so rapidly that, although he escaped himself, the barn was wholly destroyed, and he was publicly whipped in the village square as a warning to other youths.

Even at the early age of ten years all the boy's inclinations were toward chemistry and, though it may seem like heresy, he became an electrician only by chance. One of the earliest stories about his boyhood is that he induced another boy, employed by the family, to swallow a large quantity of Seidlitz powders on the theory that the gases generated would enable him to fly. The agony of his victim attracted attention and once more he was soundly thrashed—this time by his mother. However, he was not discouraged as he blamed the other boy rather than the motive power.

Young Edison when only eleven had a truck garden which he worked with the help of Michael Oates, the victim of the flying experiment. They had the use of a horse and small wagon and peddled onions, lettuce, peas, etc., through the town. As much as $600 was turned over to his mother in one year from this source.

But the youngster didn't like agriculture and about the time the Civil War broke out he managed to get permission to go on the local train as a newsboy. This train ran from Port Huron to Detroit, a distance of about 63 miles. There are a score of interesting stories about him during this period but none more significant than his reaction to the sensation caused by the battle of Shiloh, or Pittsburgh Landing, in April, 1862, in which both Grant and Sherman were engaged.

WHEN Edison reached Detroit on the day the news was received he noticed that the bulletin boards of the newspapers were surrounded by great crowds. He knew that there must be the same amount of excitement in all of the small towns along his run and decided that instead of selling the usual one hundred papers he could sell a thousand. Going to the office of the Detroit *Free Press* he boldly said he wanted one thousand papers but that as he only had money enough for three hundred they would have to give him credit. He then explained an idea he had, which was to telegraph the news ahead and have it posted on bulletin boards.

He got his thousand papers and started on the return trip. At the first station he found a crowd, thanks to his scheme of telegraphing ahead, and instead of selling only two papers he sold thirty-five. At the next station he found a still larger crowd and promptly raised the price of his papers from five to ten cents. At Port Huron he raised the price to twenty-five cents and sold out, making what was to him, as he says, "an immense sum of money."

Such were a few of the interesting episodes in his boyhood. The origin of his deafness and, incidentally, his own attitude toward it, is best told in his own words: "My train was standing by the platform at Smith Creek's station. I was trying to climb into the freight car with both arms full of papers when the conductor took me by the ears and lifted me. I felt something snap inside my head, and my deafness started from that time and has ever since progressed."

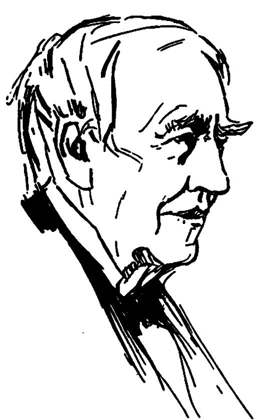
"This deafness has been of great advantage to me in various ways. When in a telegraph office I could only hear the instrument directly on the table at which I sat, and unlike the other operators, I was not bothered by the other instruments. Again, in experimenting on the telephone, I had to improve the transmitter so I could hear. This made the telephone commercial, as the magneto telephone receiver of Bell was too weak to be used as a transmitter commercially. It was the same with the phonograph. The great defect of that instrument was the rendering of the overtones in music, and the hissing consonants in speech. I worked over one year, twenty hours a day, Sunday and all, to get the word "specie" perfectly recorded and reproduced on the phonograph. When this was done I knew that everything else could be done—which was a fact. Again, my nerves have been preserved intact. Broadway is as quiet to me as a country village is to a person with normal hearing."

WHAT of Mr. Edison at the age of 82? Is he still the very human boy or has he become, because of the manner in which he is being exalted, an individual aloof? This can best be answered by quoting from a speech made by Mr. Elmer A. Sperry, president of the American Society of Mechanical Engineers, who presided at the organization meeting of the N. E. L. A. in 1885.

Shortly before his 82nd birthday Mr. Edison invited a few members of the Naval Consulting Board to come over and see him, among them Mr. Sperry. "When we came in," says Mr. Sperry, "he spied me with a cane. He said: 'Sperry, what are you doing with that cane?' I tried to explain that it was only a bad habit of mine that I had recently acquired. He said: 'I have no use for a cane, now see me kick.' He jumped up out of his chair and kicked higher than his shoulder."

"Later on," continues Mr. Sperry, "we went out about half a block in the rain, Mr. Edison without any hat, to a building where he was working on the seventeenth thousand series of plants. He had examined no less than 16,000. He showed us a plant yielding 9.6 per cent rubber, found in a canyon in Arizona. He took from his shelves in a back room notebook after notebook. There seemed to be at least forty of them, some of them in his own handwriting. They were the record of these plants. Full of activity, he said, with all the charm of his whimsical smile, 'I had to clear out my chemists from this laboratory; they knew too much. I had to get a fresh lot in, mostly youngsters'."

While literally hundreds of personal incidents about Mr. Edison are being told and retold I cannot resist the temptation to tell one of my own. A few years ago I was commissioned by a national review to write a series of articles entitled "Grading Human Beings." At about that time Mr. Edison was very much interested in intelligence tests and I decided to write one of these articles around him. I arranged for an appointment and he agreed to give me three hours.



John Alonzo Williams

Ushered into the two-story library connected with his laboratory I found Mr. Edison seated at a great, old-fashioned, oak roll-top desk. Shaking hands in a genial fashion he waved me to a chair with, "Well son, what can I do for you?"

I had written out a statement as to just what this series of articles would try to prove and at the same time had written out some 35 questions, each one on a separate sheet of paper. This method of interviewing seemed to please him, for he went to work on them at once. In each instance he wrote out the answer with the stub of a lead pencil and in each instance he elaborated his answer with a discussion. One question seemed to puzzle him for a moment. At that time Mr. Hoover was chairman of what was then known as "The National Conference on Street and Highway Safety," which had for its purpose the reduction of street and highway accidents. This question, as I remember it, simply asked Mr. Edison if he had any thoughts on the matter.

After a few moments he scratched his head and said: "Well, son, I guess that when human beings acquire the intelligence of army mules there won't be any more street and highway accidents."

We are apt to think of Mr. Edison in terms of the incandescent lamp and the phonograph. A list of his own inventions and his contributions to the inventions of others, with even the briefest of descriptions, would fill more than one volume. For example, he assisted Sholes, the inventor of the typewriter, to make the first successful working model. His invention of the quadruplex system of telegraphy saved the investment of many millions of dollars in wires. He discovered a previously unknown and unique electric phenomena, which he called "Etheric Force" and which became the foundation of wireless telegraphy. As long ago as 1883 he made a discovery which today covers the foundation principle on which every modern radio lamp (or tube) is based.

IN 1876 he invented the carbon telephone transmitter which made telephony a commercial art. This invention included the microphone which makes radio possible. He not only invented the first practical incandescent lamp, but invented radical improvements in the construction of dynamos, making them suitable for generators for systems of distribution of current.

In 1891 he invented the motion picture camera and 21 years later introduced the kinetophone or talking motion picture.

One could go on indefinitely listing his accomplishments which have had their effect on a score or more of industries. During the World War he worked on some 42 major problems as president of the Naval Consulting Board, giving up his entire time to this work for two years. With it all he has remained, as Messrs. Dyer, Martin and Meadowcroft put it toward the close of their great work on Edison, "a plain, easy going, placid American, with no sense of self importance, and ready at all times to have his mind turned into a lighter channel." No one is more impatient or intolerant of interruption when deeply engaged in some line of experiment, but, generally speaking, "Edison is easy tolerance itself, with a peculiar weakness toward those who have the least right to make any demands on his time. Man is a social animal, and that describes Edison; but it does not describe accurately the inventor asking to be let alone."

Without doubt, "Light's Golden Jubilee" will leave Mr. Edison as it found him and as I found him—a plain, easy going, placid American with a strong sense of humor and only impatient when interrupted at a time when he is working on some problem. Incidentally, I am quite sure this is the character he would like to play in the minds of the American people.

Light's Golden Jubilee

By JOHN F. QUINLAN

Executive Secretary, Light's Golden Jubilee National Committee

THE great international observance of Light's Golden Jubilee, marking the 50th anniversary of the invention of the first practical incandescent lamp by Thomas A. Edison, has been welcomed and supported by leaders of thought everywhere. The President of the United States, Herbert Hoover, when accepting the Honorary Chairmanship of the National Sponsoring Committee said *"I shall be delighted to serve in any capacity which will be a genuine tribute to Mr. Edison's services."*

Light's Golden Jubilee will be just as much an occasion for serious retrospect, profound appreciation and genuine inspiration as it will be a celebration, gala, festive, and jubilant. It will be a celebration exclusive to no one company, to no one industry, nor will it be limited to any single nation. It is upon a grateful people of the world that the blessings of Edison's genius have been showered. Light's Golden Jubilee offers the electrical industry a golden opportunity to join hands with the world at large in standing beside the man who gave the world light without flame, the man whose life is an inspiration to all, the man who stands for all that is American and good. Individually and collectively the men of the electrical industry owe it to themselves to make Light's Golden Jubilee the greatest tribute ever paid a living man.

Light's Golden Jubilee received its first formal suggestion on Edison's 82nd birthday. At a luncheon of the Edison Pioneers that gallant body of men who were associated with Edison in his pioneering days—their fellow member Dr. John W. Lieb, tentatively outlined the celebration. The Pioneers then unanimously approved the following resolution:

> "Resolved, that the President of the Edison Pioneers be requested, and he is hereby authorized to appoint a committee of five from its membership to propose to the electrical industry at large, the organization of a Sponsoring Committee which may prepare plans for the appropriate celebration of the Golden Jubilee of the Incandescent Lamp occurring during the year 1929."

The preliminary light festivals this summer have been notable. Light's Golden Jubilee was brilliantly inaugurated at Atlantic City on May 31. There hundreds of thousands of visitors joined the residents of the community who turned out en masse to witness a gorgeous spectacle of light and color in which land, sea, surf, and sky mingled and were bathed in all the hues of the rainbow. In the presence of Vice President Curtis, Preston S. Arkwright, at that time president of the National Electric Light Association, delivered the stirring address which opened the ceremonies.

Two weeks later the City of Niagara Falls dedicated its Fifth Annual Festival of Light to the celebration of Light's Golden Jubilee. All the principal streets were suffused with golden light, and the falls were illuminated by a battery of searchlights aggregating 1,440,000,000 candlepower. The Pageant Parade held on the evening of June 13, which opened the celebration, held hundreds of thousands of spectators fascinated for hours. The whole city was in festive attire, flags were flown, store-windows were especially decorated for the occasion, and Edison's photograph was displayed everywhere.

Saturday, August 31st, was Edison Day at the National Air Races, Cleveland. At 10 o'clock in the evening an open air show was held, attended by a number of distinguished guests and over 15,000 people. The program included: tributes to Edison by leading men in aviation; the Light's Golden Jubilee Derby, a race of air-mail pilots to Milan (Edison's birthplace) and return; a musical show featuring George M. Cohan's song, "Edison Miracle Man;" and a parade of girls representing the various stages of light down through the ages coming to a climax with the modern incandescent lamp and the unveiling of a large photograph of Thomas Edison. All of the festivals that have been mentioned were broadcast over nation-wide hook-ups.

The opening night of the National Convention of the American Legion, our country's largest convention, to be held in Louisville, Kentucky, September 30 to October 3, will be dedicated to Thomas A. Edison and Light's Golden Jubilee. Plans are to make it the most brilliant and colorful convention ever held. Because of Louisville's central location more than 100,000 visitors representing every state in the union and twelve foreign countries are expected to attend. Thirty-nine blocks of the business district of Louisville will be decorated and special golden lamps will light the district.

Captains of industry and finance, and a distinguished group of men and women representing practically every walk of life in America make up the personnel of the National sponsoring committee. Mr. Henry Ford considers Light's Golden Jubilee "his job of the year" and made this comment to the writer recently when he visited Mr. Ford at Dearborn, Michigan. The marked enthusiasm with which Mr. Ford has entered upon the task of giving to the world the story of what Mr. Edison's accomplishments mean to humanity indicates the deep, sincere affection which he has for Mr. Edison. All of us are familiar with Mr. Ford's manner of doing things, and it is safe to say that the culmination of Light's Golden Jubilee at Dearborn on the night of October 21 will be recorded as one of the finest tributes every given to any living person.

Meanwhile, great preparations are being made. From large cities and small towns in every part of the land, and from many distant lands as well, comes information that committees are being organized to formulate plans for local observance. Street parades, lighting festivals, floodlighting of public buildings and dwellings, special fireworks displays, dinners, and meetings and numerous other activities will be the order of the day and evening. In some parts of the country complete sections are being organized, as in New England. One state has its Governor as chairman of a state-wide committee. The Mayor of New York heads the sponsoring committee for that city.

Besides the acceptance of the Honorary Chairmanship by the President of the United States, our Government has issued a special two-cent postage stamp to commemorate the occasion. The manner in which this stamp has been received by the country at large is evidence of the great interest on the part of the public. Three hundred and thirty million stamps have been purchased since June 5. Stamps will be on sale during September and October in sheet and coil form. Owing to the unprecedented demand for coils, the Post Office Department has now decided to issue the stamps in coils of 3000.

Literally, hundreds of letters have been received from chambers of commerce, women's clubs, fraternal societies, city officials, and other organizations requesting information as to how they might be of assistance in promoting interest in their communities. Every request has been acknowledged. Governors of Arizona, California, Florida, Idaho, Indiana, Kentucky, Maine, Maryland, Massachusetts, New Mexico, Michigan, New Hampshire, New Jersey, Ohio, Oklahoma, Oregon, South Carolina, Texas, Utah, Wisconsin, and Wyoming, will issue proclamations or statements to the press prior to October 21. A number of foreign embassies at Washington will fly the flags of their countries as well as illuminate their buildings. So, truly, our country will *stand by* in honor of electricity's milestone and the universal progress made in the short span of fifty years.

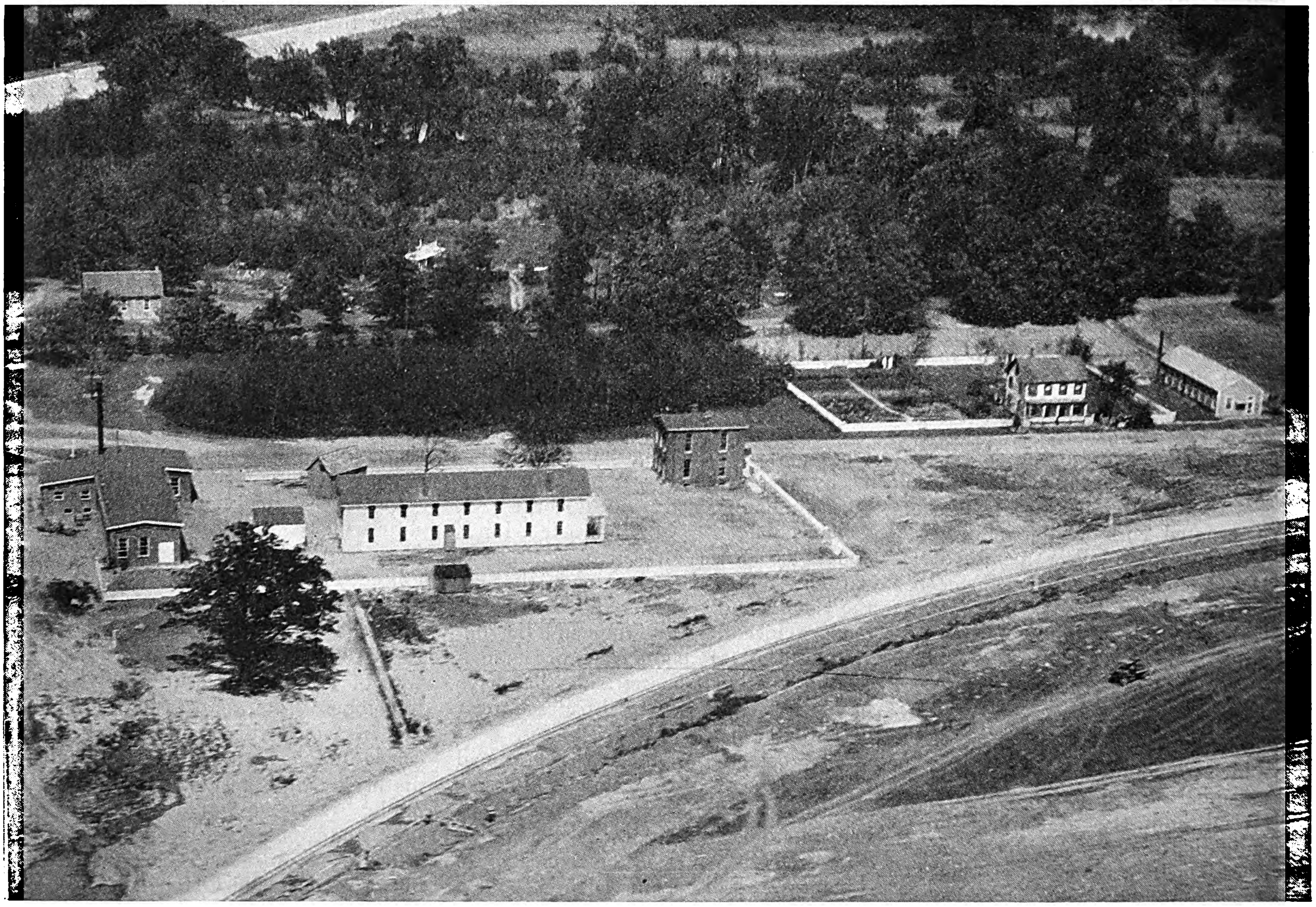
The general plans for the celebration at Dearborn are mentioned elsewhere in this issue. If you have not read them, by all means do so in order that you and your family may be at your radio on the evening of October 21. While details will be carried by the press, on October 21, central stations are urged to make suitable announcements locally calling further attention to this important program.

Light's Golden Jubilee will be magnificently supported by beautiful colored sections in the *Saturday Evening Post, Colliers Weekly* and the *Literary Digest*. What will be termed the greatest thing yet done in advertising will appear in these publications which will be available several days prior to October 21. All of these pages will be in the nature of a tribute to Mr. Edison from those branches of the electrical industry which have come about as the result of his inventive genius.

A Speakers' Bureau has been organized to care for the numerous requests which are being made for speakers to address gatherings which are being held in all parts of the country. It is estimated that several thousand addresses will be given before chambers of commerce, Rotary, Kiwanis and other civic organizations, association meetings, etc. Requests for speakers should be addressed to Mr. W. M. Skiff, National Lamp Works, Nela Park, Cleveland, Ohio. In addition, plan books, publications containing suggestions for pageants, floats, arches and decorative material are available at small cost at the Executive Headquarters of Light's Golden Jubilee Committee, 420 Lexington Ave., New York City.

The central stations of the country will take an active part in the celebration in order to show their appreciation of the man whose works mark the beginning of the electric light and power industry. Many companies in various parts of the country have assured the committee of cooperation in their respective communities.

Every light and power company will have a twofold opportunity. First, of active direct participation and, second, of encouraging others to take part.



MENLO PARK AT DEARBORN

The workshops and other buildings used by Mr. Edison and his assistants while working on the incandescent lamp at Menlo Park, N. J., have been transported by Mr. Ford and re-erected as a part of the great Industrial Museum at Dearborn, Mich. Reading from left to right, in the foreground are the machine shop, carpenter shop, glass house, laboratory building, office building and Mrs. Jordan's boarding house. At the extreme right is the Fort Myers, Fla., laboratory of Mr. Edison. In the background is the little red schoolhouse attended by Mr. Ford in his youth.

A STATEMENT

By HENRY FORD

There could be no greater satisfaction to me than to aid in paying tribute to Thomas A. Edison, whose remarkable achievements in our lifetime have so materially contributed to the advance of civilization throughout the world. His unselfish and untiring efforts to serve mankind make him today the greatest of all living Americans.

The Celebration at Dearborn

By N. H. BOYNTON

HENRY FORD expressed the thought early in the year that Light's Golden Jubilee would be sort of a national tonic as a tribute of an industrious nation to the industry of one man, and so it is proving to be. The whole-hearted accord, in America and abroad, with which Light's Golden Jubilee has been accepted and is being celebrated, has probably exceeded the dreams of the most devoted admirers of Thomas Alva Edison. The fondest hopes of those of us closest to the movement last spring are being more than realized. Universal consciousness of the great debt to Mr. Edison is no longer figuratively phrased—it is literally a fact.

WITH city after city swelling the Jubilee refrain throughout the summer and fall, with national event after national event devoting large portions of their programs to Edison tributes and Light's Golden Jubilee activities, the problem of a climax would appear to be something to reckon with. Of course, the fact that cities and towns throughout the world will celebrate the 1879 invention simultaneously on the night of October 21, is in itself decidedly climactic. It is beyond the most imaginative of us to visualize that event.

But the world's interest on the night of October 21 will center upon a quaint, modest "typical American village" at Dearborn, Mich., where Henry Ford, Edison's bosom friend, will entertain Mr. Edison, The Edison Pioneers, and a group of noted personages who are the friends of Mr. Edison and Mr. Ford, and who are deeply concerned in honoring Mr. Edison on this most memorable occasion.

At Dearborn Mr. Ford has assembled with consummate care and accuracy, the earliest developments in every walk of American life and society. He has gone to incalculable expense and effort to reclaim originals, or where necessary, to religiously reproduce them. Another such collection does not exist. In celebrating an anniversary of any event famous in American history, no finer setting could be selected.

BUT there is more to the perfect propriety in the party for Mr. Edison on Oct. 21. With Mr. Ford, every effort which he has put forth in honoring and preparing to honor Thomas Edison, has been a distinct labor of love. Mr. Ford has long been an ardent admirer and friend of the master inventor. Accordingly, it has been with an amazing personal devotion that Mr. Ford has brought about the removal of Edison's Menlo Park and Fort Meyers laboratories to Dearborn. Around these famous buildings he has assembled a typical American village, complete from village tavern to town hall and blacksmith shop. He has reproduced Independence Hall. He is creating the Edison School of Technology. These buildings are practically complete; many others are nearing completion.

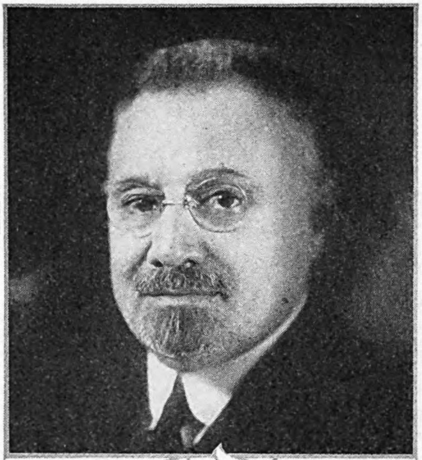
Dearborn is a scene of bustling construction, of meticulous reproduction. Each time I visit Dearborn, new wonders await my eyes. The project is beyond description. When the eyes and ears of the world turn to Dearborn on the night of October 21, they will find a perfect demonstration in a perfect setting.

THE program itself, at Dearborn, is modest. Members of the party will be brought from Detroit to Dearborn on the afternoon of October 21, traveling on a fifty-year-old train. During the day, the Edison School and Museum will be toured, along with the typical American village. A banquet will be served to the guests in the early evening at Independence Hall.

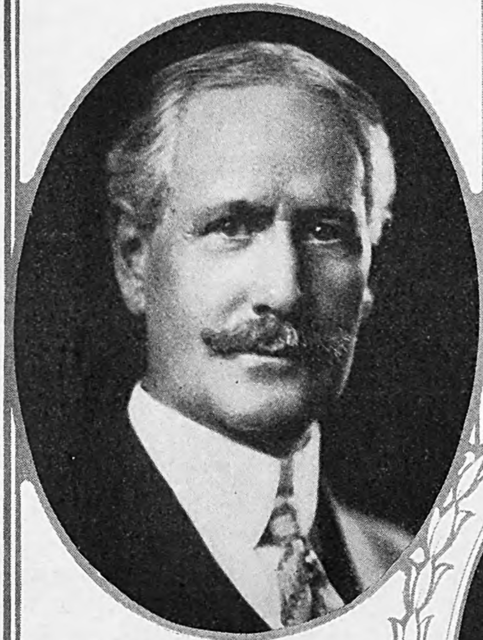
Following the banquet, the group will adjourn to Menlo Park laboratory, where the climax of the great celebration will occur. There, in company with distinguished men and women in his familiar original laboratory, Thomas Alva Edison will reconstruct the lamp of fifty years ago and make the electrical connection to it which will cause it to light. The re-enactment of this momentous occasion will be shared not only by the distinguished gathering in the laboratory but by an interested public, who will be in attendance through the radio description which will be broadcast to them.

THE world will hear the description of this event, produced over an international radio hook-up. The world will take the lighting of the 1879 lamp by Mr. Edison as a signal to festoon itself in gala light. Homes where families have sat in darkness listening to the radio broadcast, will blaze in the warmth of modern lighting.

But the party at Dearborn will never be well described. It will be the re-reading of a faded, beautiful page in an American epic. It will be the tribute of the great to the great. While famous men stand humbly in darkness, a smiling old man will live again in terms of the past—then he will touch a mechanism, and the world will be aglow. The climax to Light's Golden Jubilee at Dearborn will be an unforgetable tribute to the world's hero of industry.

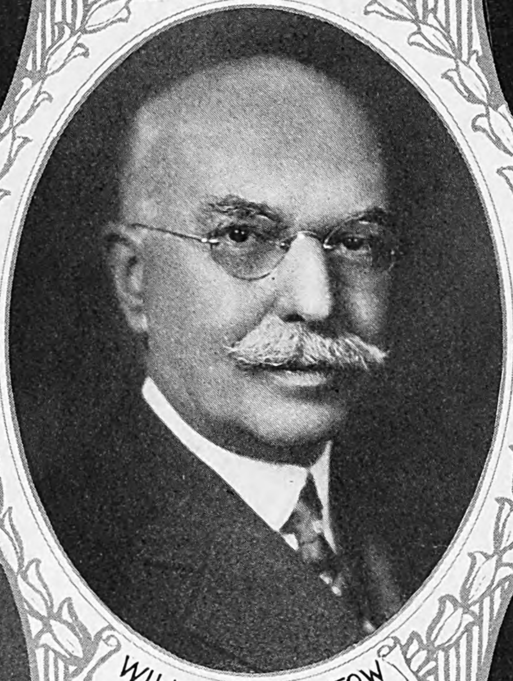


JOHN W. LIEB
CHAIRMAN
EXECUTIVE COMMITTEE



FREDERICK A. SCHEFFLER
EXECUTIVE COMMITTEE

JOHN W. HOWELL
EXECUTIVE COMMITTEE



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PRESIDENT

FRANK A. WARDLAW
SECRETARY

CHARLES E. ESTABROOK
TREASURER

WILLIAM H. MEADOWCROFT
HISTORIAN

PRESENT OFFICERS *of the* EDISON PIONEERS

The Edison Pioneers

By W. H. Easton

A LITTLE group of men, most of them past the three-score mark, will go to Dearborn in October as guests of Henry Ford to attend the celebration of Light's Golden Jubilee, in honor of Thomas A. Edison and the fiftieth anniversary of his incandescent lamp. The celebration will hold special significance for them, for they are the Edison Pioneers, an organization like no other in the world.

A small remnant of the glorious days of great achievement—brought together solely by sentiment—the Edison Pioneers serves no purpose but to honor the man who has always been a hero to his associates. They wish no more than to keep alive precious memories of those hard driven days when the faith and loyalty of his staff stood between the genius of Edison and the doubts of the world.

To Dearborn they will go then, from all over the United States and from many points in Europe. Henry Ford, their host, is himself a Pioneer. Less than 40 years ago, Ford—clad in overalls, was an employee of the Edison Central Station in Detroit at a very modest wage. Many pioneers who began their business careers in the Edison Laboratories, are now men of important affairs. Others, however, are living in retirement and because of the infirmities of age will not be able to attend the Dearborn festivities.

The organization boasts some 250 members today, but each year decreases the membership sadly.

There are four groups of members. Members outright are those who were in Edison's employ prior to 1886. Of these there are only about 20 now living who shared in the busy days at Menlo Park where the electric light was perfected and the phonograph first recorded the human voice. Associate members were in the Edison organization between January, 1886, and January, 1900. They too have a rich store of memories for they witnessed the growth of the Edison organization to fame and prosperity. Descendant members are sons or daughters of members or associated members. Mr. and Mrs. Edison and the Edison family are the honorary members.

Eleven years ago, four Edison men of long standing service decided to round up all the surviving old timers, particularly those who had a share in the exciting days of the eighties. A call was issued for a meeting in the rooms of the United Engineering Society in New York City. Twenty-eight responded. It was a strange little gathering—men who had not seen each other for decades assembled again because of a common affection and admiration for their erstwhile leader.

It was there and then, on Jan. 24, 1918, that the Edison Pioneers was formed. Gradually, others who were eligible, were located and added. Although some have drifted far afield, many have continued and still are Edison men. It is an unique group in this land of countless organizations. The mere fact that its birth occurred during Edison's lifetime and that it exists only as a tribute to him, puts it in a class by itself. Many organizations spring into being after a popular hero passes on, but rarely do men express themselves in this way during the hero's lifetime.

THE Edison Pioneers places slight tax upon its members, either socially or financially. Dues are nominal and the only meeting is the annual luncheon on Feb. 11, the birthday of Mr. Edison. This occasion is frequently attended by Mr. Edison and members of his family. If he is not present, Mr. Edison always sends some gracious word to his old associates.

Following the luncheon, the annual election of officers takes place and the business of the group is discussed. This annual occasion is always fraught with drama, for each year the ranks are thinned, and each year also, some fellow worker of early days has been dug out of obscurity and drawn into the group. These reunions are happy occasions for Pioneers who have suffered the passing of so many friends.

Although there is only the one meeting during the year, the headquarters of the Edison Pioneers at 40 West Fortieth Street, New York City, is open every day, except Sunday. It has become the mecca of all Edison Pioneers whenever they reach New York. Presided over by Frank A. Wardlaw, secretary since 1921, this office has meant many things to many members. It is above all a place where there is always a cordial welcome and warm friendliness.

Mr. Wardlaw, who entered Mr. Edison's employ in 1881, keeps a keen watch over his little membership. If there is sickness, he visits the ailing member, often going far and wide on his errands. Flowers and personal letters are sent whenever a death occurs. And if it is simply a matter of an hour's chat with some lonely Pioneer, Mr. Wardlaw has the sympathy which gives good cheer to the visit.

A veritable storehouse of Edisonia is that headquarters. Its wall's are lined with handsome paintings and portraits of Mr. Edison at various stages of his career. One wall is devoted to portraits of the presidents of the Edison Pioneers.

Officers of the Edison Pioneers for the current year are, president, W. S. Barstow; vice-presidents, F. P. Ott, J. F. Porter, James M. Seymour, F. W. Jesser; treasurer, Charles E. Estabrook; secretary, Frank A. Wardlaw; historian, William H. Meadowcroft. The executive committee includes: John W. Lieb, Frederick A. Scheffler, John W. Howell.

The honorary members are Mr. and Mrs. Thomas A. Edison, Mrs. Marion Edison Oser, Thomas A. Edison, Jr., William Leslie Edison, Charles Edison, Mrs. John E. Sloane and Theodore M. Edison, and the three grandchildren: John Edison Sloane, Thomas Edison Sloane and Peter Edison Sloane.

The members who were with Mr. Edison prior to 1886 include the following:

From New York State

Dr. Edw. G. Acheson
Edward D. Adams
A. S. Beeves
C. A. Benton
Ernest J. Berggren
T. J. Brown
Dennis Callahan
Robert A. Carter
Charles L. Clarke
Wallace S. Clark
John Diehl
W. I. Donshea
H. M. Doubleday
John Dwyer
Charles L. Eidlitz
Charles E. Estabrook
John C. Fagan
Maj. W. J. Hammer
E. A. Harley
Charles W. Jefferson
Francis Jehl
Alfred W. Kiddle
Charles G. Y. King
Joseph Lee
John W. Lieb
H. A. MacLean
W. D. MacQuesten
J. F. Madgett
Sidney Z. Mitchell
George F. Morrison
Alexander Mungle
Prof. E. L. Nichols
Henry V. A. Parsell
G. F. Peabody
William Pelzer
Charles F. Peterson
Christian Rach
Fred. A. Scheffler
Robert M. Searle
Samuel J. Shaw
Eugene A. Skehan
Henry Stephenson
Montgomery Waddell
Frank A. Wardlaw
Arthur Williams
Fremont Wilson

From New Jersey

Charles G. Barfoot
G. E. Bateman
W. M. Brock
John R. Campbell
H. A. Campbell
R. D. Fine
Edwin W. Hammer
Parker J. Hickman
Herman Lemp
W. H. Meadowcroft
M. F. Moore
J. F. McClain
John F. Ott
Eugene H. Phillips
J. W. Schroeder
C. A. Simmen

A Brief Pilgrimage into Internationalism

The author of this article has been for many years an observer of affairs which have international aspects and has spent much time in Europe having been connected, at one time, with a branch of the League of Nations. He has been frequently quoted as an authority on some of the subjects which he discusses.

ANY discussion of the international aspects of national problems, or the international phases of this or that unit in our economic structure, is almost sure to subject the one who initiates it to adverse criticism on the part of a type of American citizen who firmly and sincerely believes that Washington's warning against entangling alliances means to beware of *all* association with other nations, and that true patriotism means the *complete isolation* of the United States. Sooner or later he will be accused of "internationalism," which his critic interprets to mean some form of international brotherhood of man to the exclusion of all national emotions, and which must lead, eventually, to some form of radical socialism and even to communism in its most objectionable form.

Nevertheless, the day has gone when any nation can draw a line around itself and say to all the world, "Everything within these boundaries belongs to us and is of no possible interest to anyone outside them, just as everything within your boundaries belongs to you and has no possible interest for us." One might as well say that everyone living within a community is privileged to draw a line around his house and lot, saying: "Whatever I may do within these limits is nobody's business but my own." Such a state of affairs would mean the end of civilized society as we know it today and a return to conditions which existed before individuals and their families first began to gather together in tribes.

IT is with a full knowledge of the fact that I may be accused of a leaning toward this so-called "internationalism" that I shall discuss briefly the international aspects of Light's Golden Jubilee, as well as the international aspects of electrical science. Before I do this, however, I wish to call attention to the international aspects of various other matters which we are inclined to think of as having only a purely national interest, in order to establish the fact, if possible, that certain phases of our existence know no boundaries.

Suppose we take, for example, an unemployment crisis. There are certain aspects of the unemployment situation in many countries which are, to a certain extent, international in character and which must be taken into consideration when studying the problem in any particular country. These indicate that the causes and effects of an unemployment crisis in any country are by no means confined to the territory within the frontiers of that country. They have regard to economic forces which cross frontiers, as, for example, the fluctuations in trade and financial crises (originally local or even artificial) spreading to industry and becoming international, affecting employment in all countries through decreasing imports or exports and thus causing distress in those countries.

MANY people are inclined to think that the tariff on goods imported into the United States is a matter which is peculiarly our own business and that its effect on other countries will have no repercussion within our own boundaries. Only a few years ago Arthur Balfour, then head of a committee representing the high-speed tool steel industry of Sheffield, England, said that if a proposed tariff on steel (then in a tariff bill which was being constructed) remained, half the manufacturers in Sheffield would be forced to close, thus adding to the already heavy unemployment in England. This would mean, in the first instance, a lessening in the amount of high-speed tool steel imported into this country and, therefore, to some extent lessen our own productive capacity. In the second instance, any increase in unemployment in foreign countries must mean a reduction in its purchasing power and therefore a lessening of our own exports to that country, adding to our own unemployment.

Take the problems arising out of our immigration policy and the restrictive clauses in our immigration laws. Any reasonable person will admit that we have the right to deny admission to this country of those citizens of other nations who we think will not make desirable citizens of the United States, and to admit those whom we think we would like to have. Failure on our part to restrict immigration would weaken our economic structure in a few months.

But there is a distinct international angle to the manner in which we administer these immigration laws. There is the almost age-old question as to whether we should inspect the immigrant at Ellis Island or at the source, that is, at or near his domicile. If we should inspect at the source we would eliminate all of the hardship involved in refusing admission after the immigrant has broken up his home, sold all of his belongings and traveled three thousand miles or more, only to be returned, an economic loss to himself and his country. This, however, is a problem which cannot be solved without the cooperation of other nations, and will never be solved until we can feel secure in adopting the principle of examining the international aspects of what may seem to us to be our own national problems.

We are extremely fond of comparing our own economic and social situation with those of other countries by elaborate tables of statistics. But statistics, as we know them, are hardly comparable with the statistics of any other country. Statisticians of our own country cannot agree as to nomenclature and interpretation of figures and, if this is true, how can we expect the statisticians of countries throughout the world to be agreed as to how they should keep their figures and as to what they may mean. Ask twenty statisticians to produce tables regarding the world's production of power and you will have twenty different tables, none of which will agree.

WHEN we turn to the realm of science we enter a field which knows no national boundaries. Science is international, and its product belongs to no one nation, or race, or people. Even though we may be celebrating Light's Golden Jubilee in honor of Thomas A. Edison, we cannot, by the furthest stretch of the imagination, claim that electricity is peculiarly an American product, nor can we claim that the benefits of Mr. Edison's great work belong to us and to no other nation. In this connection, the words of His Excellency, Dr. Alberto Pirelli, President of the International Chamber of Commerce, addressed to the 52nd convention of the National Electric Light Association, are interesting. He said:

"Mr. Edison happens to have been born in the United States, but he belongs to the world. It would be idle for me to dwell on his many and beneficent inventions. Labor has been incessant with him, and his life is a song of hope to the youth of all lands. For none of us lives unto himself. Centuries ago a great poet of my own country expressed it thus: *Sic vos non vobis mellificatis apes.* That is to say, 'Not for yourselves, but for others do you produce honey bees.'

"As President of the International Chamber of Commerce I am happy to voice the admiration of business men of forty-six nations, for the work of the inventor and for the development of scientific research. And in no place is this work more manifest than in the United States.

"One great asset of electricity is that it has enabled countries like Italy, Switzerland, Norway, Sweden and others possessing little or no coal to develop their water powers for civic, domestic and industrial use, and has also made possible the conservation of other natural resources, to the great advantage of civilization. It has brought untold benefits to industry and commerce, and has provided comforts and leisure for the home, so that great multitudes enjoy a freedom and a dignity beyond that which earlier civilizations allowed. And for much of this the world is indebted to the inventive genius of Edison.

"Years ago Beethoven was conducting a performance of his Ninth Symphony. So moved and entranced with the beauty and majesty of the music did the audience become that they stood and applauded the composer enthusiastically. But Beethoven heard not, heeded not; for his ears were deaf to their cheers. For years Edison also has lived in that silence which Ibsen calls 'the home of the strong' and my hope and heart's desire is that if he cannot hear, he may at least sense how great is the gratitude of a world which this day salutes and cheers him as one of its worthiest inhabitants."

Doctor Pirelli is an Italian. He might very well have mentioned the fact that it was the experiments of Galvani, an Italian physician, which led Allesandro Volta, another Italian, to the discovery of the Voltaic pile and of voltaic or galvanic electricity. He might have said that Volta was thinking about the principle of the electric telegraph in 1777. Or, if he wished to pursue his thought that Edison and the science of electricity belongs to the world and not to any one nation, he might have called attention to the fact that the Leyden jar was presumably a product of a bishop of Pomerania, that a Swiss physician was thinking about the telegraph in 1773, as was a Scotsman in 1753. The Chinese are supposed to have used the magnetic compass as far back as 2637 B. C., while Dr. William Gilbert, physician to Queen Elizabeth, published in 1600 his "De Magnete," 106 years before the birth of Benjamin Franklin, the American, who established the fact that electricity and lightning are identical.

WHAT of the philosophy of the Far East? Sir Kengo Mori, the Chairman of the Japanese Delegation to the Reparations Conference, summed it up in a movietone address before the N. E. L. A. Convention, when he said:

"An invention whose advantages can be enjoyed by only one section of the community, or the people of one country, cannot be termed a true blessing in the sense that its beneficence extends to every man, every woman, the world over.

"I am one of these who were not so blessed in their youth. My studies were made under the oil lamp. I like to think that that time is not very long back, and it is certainly a very short time for the electric lamp to have made such remarkable progress, considering that according to the statistics I have, my country was lighted at the rate of one lamp for every two people in 1927.

"No later figures are available, which fact throws into a relief as clear as the illumination I am talking about, the rapidity of the expansion this public utility is making. Official statistics cannot keep pace with its progress.

"Let us hope that this wonderful creation may make still further progress in the days that are to come, and in its gathering strength bring light upon the questions which trouble mankind; and in the solution of which the West and the East must join hands."

Turning to the modern problems created by the development of the light and power industry, we find a famous Englishman, Sir Ernest Benn, joining with the thinking people of the United States in opposition to public ownership. Calling attention to the fact that Plato first advocated the public ownership of property, and that for twenty centuries "people who were not so well off as they would like to be have argued that there was something wrong with private ownership," he continues:

"The argument still goes on today, and yet the vast bulk of all the property in the world is still in private hands. We are asked to believe that the whole world has been wrong through all the ages and that there is a better way—the way of public ownership. It wants some courage in face of the accumulated experience of mankind to carry on this old argument, but Socialists and Revolutionaries make up in courage what they lack in brains."

And so, whether we like the word or not, we must, if we are to truly appreciate the meaning of Light's Golden Jubilee, translate it into terms of its international values. It is only by chance that Mr. Edison is a citizen of the United States. For many centuries citizens of many other countries conducted their researches and made their contributions to the foundation of electrical science which made his inventions possible. But to him is due the credit of taking the work of these other men and developing specific devices which have made untold contributions to the wearing down of the invisible but very real barriers of national prejudice that surround every nation. Through the outlets of science and commerce he has made a greater contribution to world friendship than all the diplomats that have ever been born.

Light's Golden Jubilee is a tribute to Thomas A. Edison, who belongs to the world. It is not a commercial activity where elements of personal advantage may enter, nor is it a diplomatic enterprise. It is one more stone in the structure which may make it possible for people all over the world to work together, plan together and think together. The value of international friendship is hard to overestimate.—E. G.

The Influence of Edison Upon His Associates

By FREDERICK A. SCHEFFLER

Member Executive Committee Edison Pioneers

I WAS a young man of 23 years, a draftsman, brought up in the locomotive business, just previous to my meeting Edison in May, 1881 and my subsequent employment by the Edison Company for Isolated Lighting (just organized).

In the years which followed my association with the Edison Company I learned that persistance, aggressiveness, disregard for the element of time in respect to a day's work, close attention to details, so many of them entirely new, and cultivating an acquaintance with patience that seemed almost impossible, were the things which saturated the mind of every man working for Edison. He was the personification of all of these things and if his associates did not embrace them all it was their own fault and they dropped by the wayside. I cannot remember that many whom I knew did drop out—the great majority stayed on doing their bit in the revolution that was quickly overwhelming man's daily existence, making life more enjoyable and in time reducing the hours of labor.

I believe that Edison's example as an indefatigable worker unconsciously impressed me—that is, one did not realize that he was absorbing the "will-to-work" idea, but eventually it became a natural thing to do—and my whole life has been thereby benefited, because at no time over a half century of years that I have been a worker, can I recollect that I have ever even wanted to quit working or lose my interest in any undertaking that I may have been engaged in. This is not said in a spirit of egotism, but it is necessary to bring out the point I am trying to make—that Edison has affected my whole life in this respect.

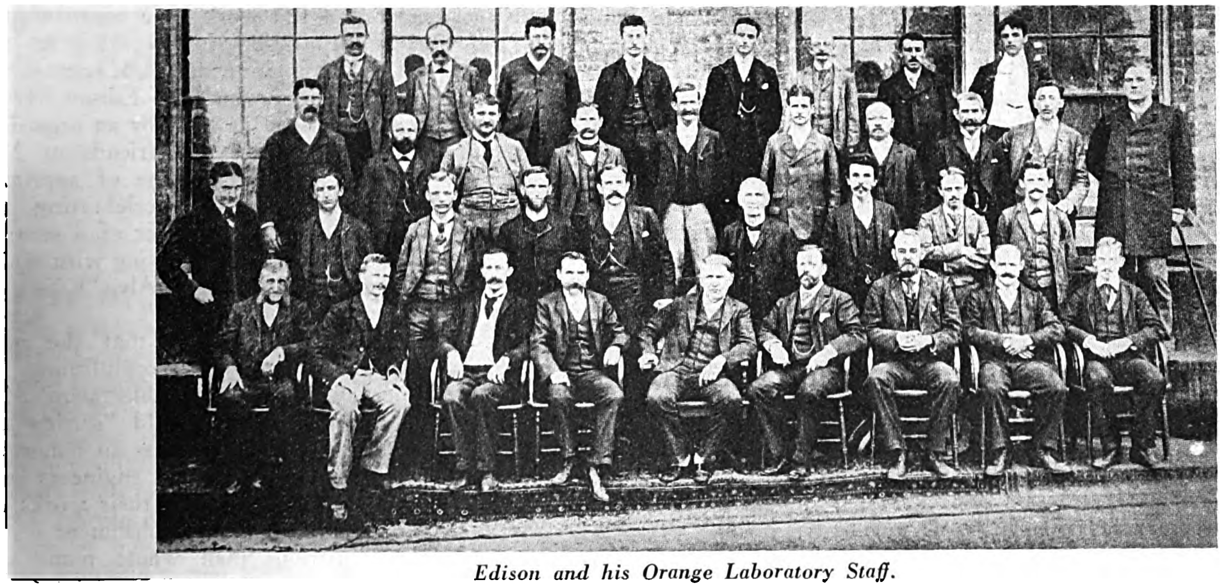
The fact that I had the good fortune in the early days of the electrical industry to become associated with the "old man" (Edison was so called even when he was only thirty-four years old by his associates, but whether he knew it or not I do not know) was also responsible for my becoming connected later with other similar manufacturing companies, in sequence. Westinghouse, Brush — through the T-H, and Sprague. These, together with my early connections with Edison, gave me an unequalled opportunity to make hosts of friends in all the different branches of the electrical, as well as mechanical industries, whose acquaintance and friendship I prize most highly. These connections also brought to me certain young men to whom I gave employment and who afterwards became great factors in the public utility industry, and they are kind enough to refer to this fact as occasion arises, but the credit for their prominent positions at the present time is all due to their untiring efforts and their close application to their business. Again, in this way, Edison has meant a great deal to me.

In a wholly different way, through love for the young "old man," his early associates have endeavored to perpetuate his name and life work by meeting once a year at a luncheon to celebrate his birthday, February 11th, under the name of the Edison Pioneers.

I little realized when I first suggested to some of my old Edison associates on Edison's 65th birthday in 1912, the idea of as many as possible of these men getting together annually on Edison's birthday for the sake of renewing old acquaintances and meeting Edison when possible, that such a small beginning would become the now world-wide known Edison Pioneers.

The start was made in a letter sent out in January of 1918, by four old Edison men, namely, Charles Wirt, Major William I. Hammer, Sidney B. Paine, and myself, to about 150 men located all over the world, whose addresses were rather dubious, but many responded. This letter called a meeting of those interested in forming an association. The meeting was held January 24, 1918, and the twenty-eight men attending organized the Edison Pioneers. The founder Pioneers are those who were associated with Edison prior to and including the year 1885. As that date occurred 44 years ago one can easily visualize the fact that there are not many still living who can qualify as founder members. At present there are only a few over 100 such members.

Had it not been for the extreme interest taken by the Association of Edison Illuminating Companies and the Electrical Testing Laboratories, and particularly the executives of these organizations, in the welfare of the Edison Pioneers, that expression of love for Edison would still be just a luncheon organization, instead of the well recognized and prominent factor it is today in the history of the electrical industry.



Edison and his Orange Laboratory Staff.

Edison and the Association of Edison Illuminating Companies

By PRESTON S. MILLAR

Secretary

THE Member Companies of the Association of Edison Illuminating Companies occupy a unique position with respect to Mr. Edison by reason of the fact that they are licensees, or have been licensees, or have acquired the properties of licensees, under the Edison patents for the operation of central station light and power systems. This relationship brings into relief Mr. Edison's position as the founder of the industry in which they are engaged. It places the Member Companies in the much-prized position of being executors of his concept of public electrical service.

Edison's penetrating analysis in 1878 of the requirements for an electrical system providing light and power service to the public and his clear concept of a method of meeting these requirements displayed an acumen which might seem to us to have amounted almost to prescience or intuition, were it not for the many demonstrations he has given of his remarkable proclivity for clear thinking and straight reasoning. Before anyone else had thought of such a system, Edison, in 1878, contemplated the combination of a generating station, either steam or water power, and a distribution system. He dismissed as negligible, the potentialities of isolated plants. He visualized a service that would bring to the public not only light, but also heat and power. He proposed to light homes, run elevators, sewing machines, and other mechanical devices, and to cook food by current so supplied. Who but Edison, at that time, could have anticipated the great public electric service, so thoroughly the materialization of his ideas, which we now enjoy?

Through the years of the great growth of these Member Companies the name "EDISON," rightfully in the corporate titles of many of them, has been an inspiring symbol, the reputation of which they have cherished zealously. Now that fifty years of experience attest the soundness of Edison's early concept of a light and power service, it is an honor, on behalf of the Association of Edison Illuminating Companies, to be privileged to express the affectionate esteem in which Mr. Edison is held by the central station industry; to join in the general acclaim with which this year we hail the fiftieth anniversary of his development of a practical light and power system; and to extend its congratulations to one who will always remain, to the industry, the "Grand Old Man."

Edison and the American Institute of Electrical Engineers

By F. L. HUTCHINSON

Executive Manager

THOMAS A. EDISON'S characteristic, clear cut signature occupies a prominent place upon the original call issued in the spring of 1884 for the organization meeting of the American Institute of Electrical Engineers. This historic document occupies a conspicuous place in the members' room at the Institute's headquarters in New York. In the list of charter members of the Institute who were associated with Edison at this time may be found the following whose names are known throughout the electrical industry: Alexander Graham Bell, Charles F. Brush, Stephen D. Field, Norvin Green, George A. Hamilton, Edwin J. Houston, C. O. Mailloux, T. C. Martin, Frank L. Pope, Elihu Thomson, Theo N. Vail, and Edward Weston.

This document stated that "it seems probable that those persons who are interested in our electrical, scientific, educational, manufacturing, telegraphic, telephonic, and like concerns, as well as the users of electrical appliances generally, will find it to their advantage, personally and collectively, to establish, support, work for, and generally aid our proposed Society."

Edison was not only one of the organizers of the Institute, which represents the electrical engineering profession in the United States, but at the first election of officers on May 13, 1884, he was elected a vice-president.

Thus in the days when electricity was truly "in its infancy," Mr. Edison was actively interested in creating an organization, the objects of which are, as stated in its Constitution, "the advancement of the theory and practice of electrical engineering and of the allied arts and sciences, and the maintenance of a high professional standing among its members."

Edison's work and achievements and their effects upon the electrical industry, and upon our present day civilization, are well known to all. His character and life work have constituted a great inspiration for workers in the fields of engineering and science, in recognition of which the Edison Medal was established in 1904 by an organization of associates and friends of Mr. Edison, "for the purpose of appropriately recounting and celebrating the achievements of a quarter of a century in the art of electric lighting with which the name of Thomas Alva Edison is imperishably indentified."

This group decided that the most effective means of accomplishing its object was by the establishment of a gold medal which should "during the centuries to come serve as an honorable incentive to scientists, engineers and artisans, to maintain by their works the high standard of accomplishment set by the illustrious man whose name and features shall live while human intelligence continues to inhabit the world."

The American Institute of Electrical Engineers was invited to undertake the responsibility of making the awards. The institute gladly accepted and, for this purpose, organized the Edison Medal Committee, consisting of 24 members.

The By-laws of the committee provide for making one award each year and the Deed of Gift, creating the medal, specifies that the award shall be made "to some one resident in the United States or Canada for meritorious achievement in electrical science, electrical engineering, or the electrical arts."

The first award was made to Dr. Elihu Thomson in 1909; followed by awards to: Frank J. Sprague, George Westinghouse, William Stanley, Charles F. Brush, Alexander Graham Bell, Nikola Tesla, John J. Carty, Benjamin G. Lamme, W. L. R. Emmet, Michael I. Pupin, Cummings C. Chesney, Robert A. Millikan, John W. Lieb, John W. Howell, Harris J. Ryan, William D. Coolidge, and Frank B. Jewett.

Recently the American Institute of Electrical Engineers has been privileged to give further recognition to Mr. Edison's services and achievements. The Constitution of the Institute provides that Honorary Members may be chosen, upon the unanimous vote of every member of the Board of Directors, from among those who have rendered acknowledged eminent service to electrical engineering. Prior to last year the very few distinguished scientists and engineers, thus elected were all from foreign countries. In June 1928 the Directors' decided to admit five outstanding American Engineers to this honor; the name at the head of this American group was Thomas Alva Edison.

Edison and the Illuminating Engineering Society

By A. B. ODAY

General Secretary

IT HAS been stated that Light's Golden Jubilee will be just as much an occasion for serious retrospect, profound appreciation and genuine inspiration as it will be a celebration. It will be a celebration exclusive to no one company, association, society or industry, nor will it be limited to any single nation. It is upon the people of the world, upon a grateful people, that the blessings of Edison's inventive genius have been showered.

It is with a spirit of "profound appreciation and genuine inspiration" that the Illuminating Engineering Society views the elaborate preparations being made to do honor to the man who is so largely responsible for the tremendous advancements in our present-day civilization, the man to whom we are forever indebted for most of the gifts of light and power which very largely make life what it is today. The Illuminating Engineering Society feels particularly indebted to Mr. Edison inasmuch as his invention of the first practical incandescent lamp paved the way for the present-day light source upon which practically all modern illuminating engineering practice is based. The art and science of illuminating engineering has been developed to a point where it now takes its place with other branches of engineering and plays a vitally important part in bringing to the millions of our population opportunities for a better, a broader, a more satisfying existence through the use of adequate artificial illumination for home, office, shop, industrial and transportation needs.

We celebrate this year the golden jubilee of electric light to honor Thomas Alva Edison who has devoted his life to labor in the service of mankind and who is now at the fiftieth milestone of his greatest achivement. The organization of the entire electrical industry in this magnificent tribute to its founder, the widespread interest and enthusiasm with which the people of many countries are organizing to do honor to "the Giver of the Light" is a source of pride and inspiration to all illuminating engineers and especially to the members of the Illuminating Engineering Society.

Edison and the National Electrical Manufacturers Association

By ALFRED E. WALLER

Managing Director

FROM those supreme virtues of mind and spirit which enabled Thomas Alva Edison to create a world change, the electrical manufacturing industry derives inspiration for public service. His was an outstanding gift to humanity. Born of indefatigable labor, enduring faith, scientific structure and infinite promise, the modest beginnings of our industry have grown to give mankind a new stature and a new horizon. With this has come courage and happiness—the true quality of Edison's achievement.

In carrying forward the thousands of torches lighted from the flame of this man's genius, the electrical manufacturers, both individually and collectively, appreciate the depth of their obligation to him and their responsibility, which is to preserve and develop his works for the benefit of posterity. Progress and service are obligatory.

In this era of prosperity, in company with a grateful world, liberated by electricity, we of the National Electrical Manufacturers' Association take this occasion of Light's Golden Jubilee to offer Mr. Edison our heartiest congratulations, our unbounded admiration and every good wish for his continued health and happiness.

The Electrical Leagues as Coordinating Units in Light's Golden Jubilee

By KENNETH A. McINTYRE

Managing Director, The Society for Electrical Development, Inc.

A GREAT measure of the success of Light's Golden Jubilee will be the degree to which the national plans are carried through locally.

In this latter connection it is fortunate that among the tools available to the industry in an undertaking of this kind are the more than 100 electrical leagues and clubs functioning throughout the United States and Canada. These organizations have been created primarily to promote market for electric service and supplies through cooperative means, and to participate for the industry in civic affairs. They are ready and anxious at all times to play their part in a movement such as Light's Golden Jubilee. Operating in territories with a total population of 33,325,000 the leagues generally report that they are scheduling this celebration as a major activity of the year.

The Society for Electrical Development as the national headquarters of this local industry movement functions in this connection by distributing information about the activity; fostering and promoting it from headquarters and through field contact.

The S. E. D. in turn maintains close relations with the National Committee and has not only distributed official bulletins and plan books to the leagues but has devoted a considerable part of its monthly publication during recent months to report developments of the activity. Another step in forwarding this undertaking was provided through inclusion of an address on Light's Golden Jubilee in the program of the recent League Conference attended by representatives of some 58 of the operating leagues of the United States and Canada. H Freeman Barnes was the speaker and dramatized most skilfully and effectively the plans worked out nationally to make this tribute to Mr. Edison one worthy of our great industry.

Many of the league managers present outlined their plans. Space does not permit giving these in detail but the extent to which the leagues are participating and the enthusiasm displayed may be judged from the following digested reports from representatives cities which give a cross-section of organized local activities.

Hudson-Mohawk and affiliated Electric Leagues (Albany, New York.) This organization has set up a general committee and each of the nine affiliated local organizations will have its own committee. School children will be given reprint of article on Thomas A Edison, and physics classes supplied with replicas of first lamp. There will be an essay contest in the Junior-Senior High School. Speakers will address luncheon clubs, Rotary, Kiwanis, Lions and other gatherings on "Edison, the Benefactor of Mankind." Activities will be tied in with local Chambers of Commerce. Special lighting arranged including golden lights for street lighting and colored lights for water falls, fountains and the like. Special articles including interesting anecdotes and stories of Mr. Edison's life and inventions will be prepared suitable for local newspapers and other mediums.

At a meeting of the Board of Directors of the Society for Electrical Development, Inc., held at Atlantic City, New Jersey, Tuesday, June 4, 1929, the following preamble and resolutions were unanimously adopted:

WHEREAS, this meeting occurs at the beginning of Light's Golden Jubilee, which celebrates the fiftieth anniversary of the practical development of the incandescent lamp, and

WHEREAS, we realize that participation in a great industry dedicated to the service of the public was made possible only by this great achievement, and

WHEREAS, this Jubilee affords an opportunity to pay special tribute to the man to whose genius are attributable the great blessings which have been showered on mankind through the agency of his invention, and

WHEREAS, it is realized that the birth of the incandescent lamp was the beacon light which more than any other one agency led us to our present stage of industry development, resulting in a greater stability of business and our present standards of comfort in living,

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the Society for Electrical Development, Inc., speaking for its membership, which represents all groups in the electrical industry, desires to place on record its appreciation of the great debt we owe to Thomas Alva Edison, the master mind of the electrical industry,

AND BE IT FURTHER RESOLVED that a copy of this resolution be forwarded to Mr. Edison as an earnest, though inadequate, expression of our admiration and esteem.

For the Board of Directors,

W. W. FREEMAN,
President

CHARLES L. EDGAR,
Chairman, Executive Committee

Electrical League of Youngstown, (Ohio). The official Edison poster will be reproduced on double sided banner, 24 feet high by 20 feet wide and suspended over the public square. Radio and Electric Show will be held to tie in with the Jubilee. The manager of one of the local amusement parks will show some jubilee pieces as part of fire works display. Street lighting standards in public square will have special globes. All downtown street lighting will be provided with golden colored screens. The tower and two top stories of the new Central Bank Building will be permanently flood lighted in white. Educational talks will be given before the civic clubs and organizations. Efforts being made to have the larger stores and office buildings install applique lighting.

The Electrical League of Cleveland, (Ohio). Widespread activity has been organized and committees are working on the job. The cooperation of various local groups and associations has been obtained and arrangements made with city for installation of appropriate street lamps. Public buildings will be decorated and flood lighted and special tie-in will be made with automobile Chambers of Commerce in surrounding towns for parade to Edison's birthplace at Milan, Ohio. Special night aeroplane race and other features will make an outstanding celebration.

Electrical League of Rochester, (New York). Will flood light public fountain in conspicuous place and public and fraternal organization buildings and public gardens. Main thoroughfares will have amber tinted lighting globes. Illuminated signs will be displayed. Radio broadcasting programs will consist of music and talks on Edison and the service of light. Special addresses will be made before groups in churches, schools, colleges and clubs, and other character building institutions. Newspaper features will be carried up to and including October 21, and there will be daily advertisements in all local newspapers during the week

October 14 to 21. Displays in windows of buildings of the Power Company, Retail Merchants Council and lobby of Chamber of Commerce and decorative lighting in stores, theatres, hotels and large industrial plants. Edison display will occupy a booth at the Rochester Exposition.

Electric League of Indianapolis, (Indiana). The famous Soldiers and Sailors Monument in the center of the circle will be flood lighted, and lighting displays made on buildings around the circle. Street lighting will be one of the features. The Federal Building, University Square Park, the Indiana War Memorial, the new Scottish Rite Building and other famous edifices will have special illumination. The carillons in the Scottish Rite tower will play "The Star Spangled Banner" and other appropriate music. Special moving pictures of the life of Thomas A. Edison will be shown from the North Plaza of the War memorial.

St. Louis Electrical Board of Trade (Missouri). Large sponsoring committee appointed, headed by Mayor Miller and Louis A. Egan, President of the power company. The Electrical Board of Trade is co-operating with this committee in arranging for a big celebration.

Electrical League of New Orleans (Louisiana). Main point of celebration will be Lafayette Square Park in front of the City Hall. Exteriors of buildings surrounding the Park, public monuments and local institutions will have special illumination sponsored by Chamber of Commerce co-operating with league.

Electric Club of Houston (Texas). This organization is arranging for speakers at club luncheon during week of October 21. Owners of buildings are co-operating by leaving on all lights in buildings on that evening. Essay contest organized and extra feature will be a special radio program.

Manitoba Electric Association (Canada). League is co-operating with local organizations to participate through special lighting installations.

The Electric Club of Louisville, (Kentucky). One of the features of celebration will be entertaining the members of the American Legion which will hold its annual convention in Louisville. The first night of the convention will be dedicated to Mr. Edison. Ten thousand special lights will be used in festoons covering the principal streets of the city.

Cincinnati Electric Club, (Ohio). Aeroplane parade is being planned in conjunction with Aviation Corps. New building of power company will be feature of the celebration with special flood lighting. Electric show will be held to tie in with special exhibitions. The orchestra of Vincent Lopez, and other entertainers have been engaged. Window display contest is one of the units of comprehensive plans.

Electrical League of Milwaukee (Wisconsin). Rotary Club will sponsor local celebration. A Food Show during the week of October 21, and spectacular demonstration will be held in public auditorium. Local Radio Trade Association is tying-in. Downtown Business Men's Associations are arranging for special illumination and there will be a window display contest for merchants and an essay contest among the school children.

Electrical League of the Tri-Cities (Rock Island, Illinois). This League will furnish stores with lithographed posters of Edison and waterproof banners for street decoration. Local white ways will be changed in Rock Island, Moline, East Moline, Davenport and Bettendorf to golden paths of light. Chambers of Commerce are requesting merchants to decorate windows with golden tinted materials and lights. Special features include electric fountains, flood lighting the front of buildings and pageants of light on one of the local football fields are included.

Electric League of Erie (Pennsylvania). Street light globes will be changed to golden colored, supplemented with festoons. Public docks will have an aurora borealis and water fountains in public parks will be flood lighted. There will be moving pictures of Thomas A. Edison and the exteriors of the theatres decorated with fitting illumination. Hotels and office buildings will be flood lighted and decorated and merchants are making timely window displays depicting contrast of styles of 1879 and 1929. The Yacht Club contemplates a water pageant and the two air ports are considering demonstrations of flying with illuminated planes. There will also be special addresses at schools. Churches, luncheon and service clubs are holding special services and meetings.

Electrical League of Richmond (Virginia). Contemplates flood lighting of Battle Abbey, St. John's Church and the Robert E. Lee monument and other historical monuments and buildings. Stores will have special decorations and a pageant is being organized by the Community Recreation Bureau. Special electric signs with golden lamps and other lighting features will be employed. Special lectures and addresses will be given at Virginia Mechanics Institute. About one hundred and sixty (160) street lighting ornamental standards will be dressed up with silhouette effects showing the figures of 1879-1929.

Electrical Extension Bureau of Detroit (Michigan). Plans are being worked out through Board of Commerce with support of the Mayor. October 21 to be set aside as special day to pay tribute to Mr. Edison. Downtown celebration will be held, tying-in with exercises at Dearborn. Funds of approximately $25,000 being raised to install electrically lighted fountain in Grand Circus Park as gift to city. Library and Art Museum and other institutions will be flood lighted and streets will be turned into paths of gold by use of special globes. Special addresses at schools and newspapers considering sponsoring essay contest.

Electrical League of Colorado (Denver). Every line of business and industry joining in celebration to culminate in seven day observation preceding Edison Day October 21. Program of night sports in University Stadium including football game played under flood lights. Display of old and modern lighting in city auditorium. Talking movie of Edison and special program broadcast on Edison night. The spray of electric fountain dedicated to Light's Golden Jubilee will be used as background showing colored likeness of Edison. Three main business streets to be decorated with festive lighting. All public buildings will be illuminated and there will be a huge "Welcome" arch to greet visitors emerging from Union Station. Some of the trains will be designated as "Golden Jubilee Trains." Illuminated airplanes and sky lighting, Edison Day exercises at schools and special services at churches will be among features.

Electric and Radio Association of Kansas City (Missouri). Bronze tablet will be sunk in large boulder placed in public square near Union Station with suitable dedication ceremonies. Convention hall seating 10,000 people will be used to broadcast special program. Edison films will be shown. Special decorations for electric and radio expositions will tie-in with Edison pageant.

Metropolitan Electrical League, (Boston, Mass.). Boston Chamber of Commerce, Associated Industries of Massachustets and Power Company are tying-in with well-rounded program. All plans being worked out under general committee. Special illumination and other features included.

The Electric League of Washington, (District of Columbia). This organization will sponsor model electric home with spectacular lighting of grounds. Gold colored screens to be installed on principal residential street lamps and merchants requested to dedicate at least one window to Mr. Edison, supplemented by suitable interior decorations. Theatres approached to install special lighting and play suitable overtures and include prologues on Mr. Edison.

Electric League of Pittsburgh (Pennsylvania). Electrical interests with Power Company and league working out splendid program in co-operation with Chamber of Commerce. A number of committees already appointed, each of which is responsible for some phase of the local activity. All business firms, including department stores, food stores, as well as industrial plants are being tied-in.

The West Coast. Out on the west coast, the story is perhaps best recited by a detailed account from Victor Hartley, executive secretary of the California Electrical Bureau, which covers the state through 26 operating districts.

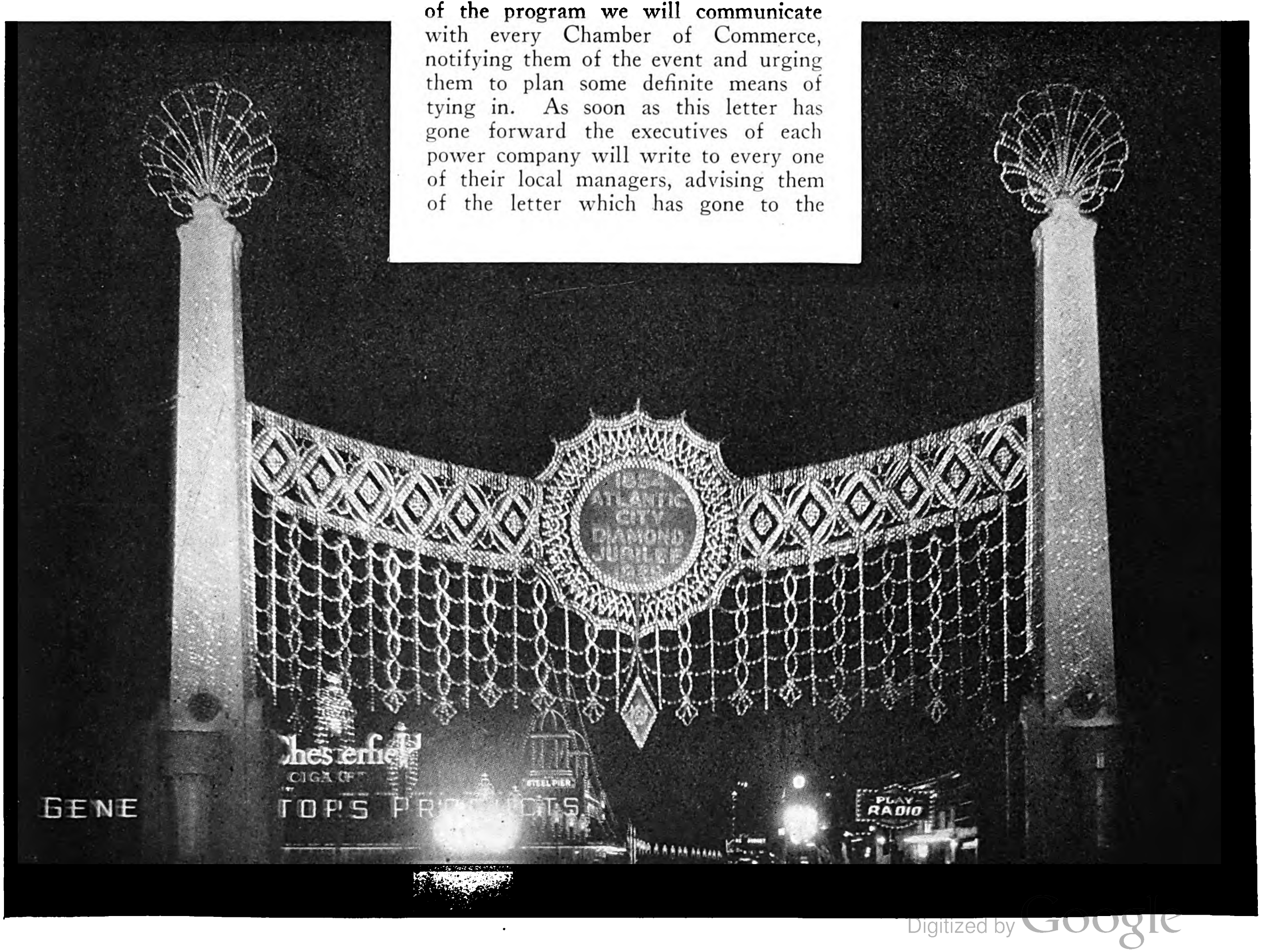
Mr. Hartley advises the society as follows:

"The program for promoting Light's Golden Jubilee lies in the hands of two committees, one under the Chairmanship of E. P. Markee, General Electric Company, Los Angeles, who will be responsible for the success of the program in Southern California; the other under the Chairmanship of Morris C. Hixson, Edison Lamp Works, San Francisco, responsible for the program in Northern California.

"With each of these committees the California Electrical Bureau will work very closely, acting as a clearing house for all information and publicity as well as aiding them financially. What the details are of the southern committee's plan I cannot say as I do not know that they have been definitely formulated as yet. Here in the north we have divided our program into two sections, Metropolitan program covering San Francisco, Oakland and Berkeley and a program for the outside territory covering the balance of the northern part of the state. Under this second part of the program we will communicate with every Chamber of Commerce, notifying them of the event and urging them to plan some definite means of tying in. As soon as this letter has gone forward the executives of each power company will write to every one of their local managers, advising them of the letter which has gone to the Chamber and instructing them to follow the matter through to see that prompt and effective action is taken in arranging a local program.

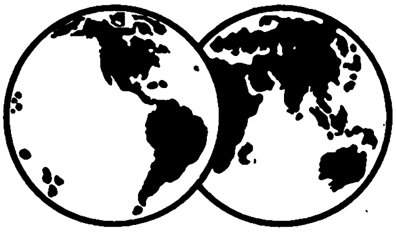
"In San Francisco and the East Bay we are endeavoring to have the activity sponsored by some such civic group as our Down Town Association. With their backing we will then proceed a program which will in itself bring Light's Golden Jubilee to the attention of the public as well as being productive of newspaper publicity. A proclamation from the Governor of the State will declare the week ending October 21 as Edison Week in order that all of the activities may culminate on that night. It is our plan in San Francisco and the East Bay to have Light's Golden Jubilee banners on the street cars, and we are planning a comprehensive program of talks at service clubs throughout the state which will consist of brief announcements of Light's Golden Jubilee throughout September and feature talks occupying the entire program of these clubs between October 1 and 21.

"We realize that in addition to these customary campaign methods we should have, at least in our Metropolitan program, some big feature or spectacle but what that is to be has not yet been determined."



Light's Golden Jubilee in Foreign Countries

By HOWELL H. REEVES



THE contributions to the growth of the electric light and power industry have been truly international. There is scarcely a country in the world that has not made distinguished gifts to electrical science. Faraday, Swan, Volta, Ampere, Siemens, Gramme, Jost, Hanaman, de Ferranti, Fujioka, Yoshima, Dawson are but a few among the illustrious names that will be ever remembered for their work in bringing light to the world.

There have already been held centenary, or other celebrations commemorative of the work of some of these, and in which celebrations America has been proud to join. Now the time has come when a wonderful tribute is being paid to a pioneer in the electrical field who is still living. By the accident of birth he happens to be an American. His forbears were Dutch and Scotch. His father was born in Canada. So it is that not only the people of the United States of America are proud to honor Mr. Edison, but many foreign countries as well have expressed the intention of honoring him in the celebration of Light's Golden Jubilee.

This is most fitting for Edison gave his lamp to the world, not to any restricted part of it. The benefits from his invention have been available to every nation impartially. All nations use electric light; and, as we know to be true of our own country, much of the universal progress in living comfort and industrial prosperity is largely due to its existence. Light may well be called the essence of civilization. Throughout the ages the peoples of the world have been fighting darkness. Mr. Edison, working on his problem, was laboring in the interests of mankind; he was exerting his genius, patience, and perseverance, not for the people of the State of New Jersey, not for the people of the United States, but for every human being, with the conviction that man was not meant to spend half his life in darkness.

A celebration carried on exclusively by the United States just because Edison happened to live and do his work within her boundaries would be unbalanced. No matter where Edison had been born he would have been challenging, striving, and—knowing the man as we do we can assume—succeeding.

On the occasion of Light's Golden Jubilee the peoples of the earth, irrespective of race, color, or nationality, who are grateful to Edison for his work are joining to pay tribute. And in so doing they are brought together by a high purpose. It requires a great incentive to unite such a variety of peoples in one great movement. When such an incentive exists it is of inestimable value in the promotion of goodwill and understanding among nations. Of great significance, therefore, is the international aspect of Light's Golden Jubilee.

The International Commission on Illumination has played an active part in stimulating interest all over the world in this celebration. It has been instrumental in organizing activities in many countries.

The plans of all countries are not known in detail at the time of going to press with this article, but the following summary will give some idea of the world-wide extent of Light's Golden Jubilee.

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ARGENTINA

The Sociedad Argentina de Luminicultura, an organization recently formed for the promotion of lighting, is planning a Light Festival to be carried out by the business organizations of Buenos Aires. While the plans are incomplete, one of the features will be in the nature of a window lighting campaign extending over a period of two weeks. It is planned also to secure the cooperation of government authorities and municipalities for the general illumination of buildings, including probably a waterfront lighting display. It is expected that at least certain of these features will occur during the two weeks' period including Oct. 21.

AUSTRIA

Austria is planning a Light Festival during the Autumn Exhibition from Sept. 2 to 8, and during the annual Congress of the German Association of Technical Illumination, Sept. 12 to 14, both of which will be held in Vienna. Every modern publicity method will be used to insure the success of Austria's celebration, including the radio, the press, and educational activities carried on through the schools. Addresses will be delivered by leading Austrian scientists who have been closely associated with the development of the incandescent lamp, and the public will be given an opportunity to observe machines formerly used in lamp production.

CANADA

In the Province of Quebec, the Sponsoring Committee for Light's Golden Jubilee is headed by Premier L. A. Taschereau as honorary chairman. The other members of the committee include many of the most prominent people in the Province. The Montreal Honorary Committee is headed by Mayor Camillien Houde.

The plans in the Province of Quebec include several broadcasting programs, the presentation of silver cups in several competitive undertakings besides many other appropriate activities. Among the features planned are floodlight displays for Montmorency Falls, the Parliament Buildings, and the fountains of the city of Quebec.
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CHILE

The Chilean delegate to the N. E. L. A. Convention was greatly interested and volunteered to cooperate with others in Chile in preparing a program. Details of the plans have not yet been made public.

CHINA

China will endeavor to make the commemorating date of Light's Golden Jubilee, Oct. 21, a special one in the history of Electric Light in China. Special advertising, special displays, posters, and moving pictures, will preceed the climax on Oct. 21, when an "Edison Day" party will be given the local Chinese electrical dealers and foreign officials.

FRANCE

While details are as yet incomplete, the Secretary of the French Committee on Light and Heat has written:

"We assure you that the French National Committee will join in celebrating this 50th Aniversary and in commemorating, in the month of October, Edison's important invention."

GERMANY

A letter from the President of the German National Committee of the International Lighting Commission contains the following:

"The Deutsche Beleuchtungstechnische Gesellschaft, which already in its telegram of June 30, 1929, to the Mayor of Atlantic City made reference to its participation in the American Jubilee festivities will also follow with the greatest interest the further course of Light's Golden Jubilee.

"An opportunity for practical participation will be offered at the meeting this year of the Deutsche Beleuchtungstechnische Gesellschaft in Vienna on Sept. 12 to 14, 1929. It has been arranged that in connection with this meeting the development of the flow lamp will be referred to, and honor will also be given to the pioneer work of Thomas Alva Edison."

HOLLAND

At the present time the cities of Amsterdam and Dordrecht are interesting themselves in the event. Details of the plans are incomplete.

ITALY

The Italian electrical industry has made excellent arrangements on an elaborate scale for celebrating Light's Golden Jubilee, and has requested copies of all printed matter, plan books and details of the program as developed in America.

Italy's honorary committee is headed by S. E. Giuseppe Belluzzo, Minister of Public Instruction and S. E. Alessandro Martelli, Minister of National Economy.

Associated with these two Cabinet Ministers on the honorary committee are presidents of thirteen national societies of the Sciences and Arts besides several members of the Nobility.

The Executive Committee is headed by Hon. Gv. Uff. Prof. Ing. Giacinto Motta, President of the Federazione Nacionale dei Gruppi Elettrici e della Unione Nazionale Fascista Industrie Elettriche, President of the A. N. S. I.

The Committees include all the most prominent names in Science and Industry in Italy and this is proof of the interest taken by that country in the celebration of Light's Golden Jubilee.

JAPAN

Already 250,000 Yen have been appropriated in Tokyo alone for activities to be carried out in that city and in adjacent territory. The committee in charge, under whose auspices the appropriation was made, consists of fifteen representative organizations including the leading engineering societies, the Japanese Broadcasting Society, the City Beautification Society, the Department Store Guild and a number of other groups. The program will include an exhibition on illumination, a demonstration of 50 kw. lamps, a model electrical home, banquet and gala celebration on Oct. 21 at the Imperial Hotel, public lectures by the Nation's prominent illuminating engineers at Tokyo Imperial University, essay contest on Light under the auspices of the Electric Society, and a Light Festival. High-intensity street lighting is to be installed on the principal business streets of the city, and Hibiya Park and the ground at Meiji Shrine will be similarly illuminated. At the Imperial Theater and Imperial Hotel Auditorium dances concerning electric light will be staged for the occasion. Moving pictures of Edison and his lamp will also be shown at leading moving picture theaters.

MEXICO

Conferences are being arranged in Mexico to formulate plans, and suggestions have been requested. The annual banquet of the Mexican Section, American Institute of Electrical Engineers, will probably be held on October 21, when the radio program broadcast from Dearborn, Mich., will be picked up on short-wave equipment and rebroadcast throughout the country.

PERU

We have heard that in Peru there will be special flood lighting, spectacular lighting, and window displays in connection with the celebration although the details of the program have not yet been received.

PORTO RICO

"We are planning a public celebration down here on Oct. 21 for Light's Golden Jubilee. The writer is on the committee and responsible for moving pictures and radio entertainment for that night. As long wave transmission is very independable down here, we are planning to receive over one of the short wave bands and with the aid of powerful amplifiers give a public entertainment of the proceedings at Dearborn."

The above is from a letter written by Mr. H. L. Talbot.

SWEDEN

In Sweden a special Golden Jubilee issue of the journal *Era* is being planned and arrangements are being made to feature motion pictures throughout the country dealing with the life of Edison and depicting progress and developments in lighting of a popular nature.

Mr. Edison's Protegé

WILBER HUSTON, sixteen-year-old Seattle, Wash., boy, the new protegé of Thomas A. Edison, is bearing his honors with a rare and becoming modesty.

Competing with 48 other youths, representing the states of the Union and the District of Columbia, who in turn had been selected through competitive examinations by the State Boards of Education as the most likely representatives of the several commonwealths, young Huston made the highest mark in the difficult elimination test prepared by Mr. Edison himself. The tests were held at the Edison laboratory in Orange, N. J., the first of August, the judges being Mr. Edison, Dr. Samuel W. Stratton, Henry Ford, Col. Charles A. Lindbergh, George Eastman and Dr. Lewis Perry.

Dr. Stratton's own school, the Massachusetts Institute of Technology, was selected by Wilber as the place where he will specialize for the next four years in chemical engineering, with all expenses paid by Mr. Edison.

The winner is the son of Bishop S. A. Huston of the Episcopal Diocese of Olympia. He was graduated from Lakeside High School last June. He is a slender boy, a little above average height for his age. Hornrimmed spectacles give him a bookish air, but his color and ebullience speaks of life in the open. Brown hair, hazel eyes, a slightly pointed nose, an easy smile. Newspaper reporters, trying to describe him, summed him up as "a good average American boy."

Wilber was revealed by the Edison questionnaire as one who would sacrifice comfort for success, but not honor, health, happiness, love, riches, nor reputation. He thinks "it is permissible to lie when it saves trouble, pain or grief, and you don't benefit in any way."

He has never been a boy scout or a member of the Y. M. C. A. He does not smoke. He was on the fencing team of his school, the small private Lakeside School in Seattle. His hobby is tramping along the shores of Puget Sound at low tide, collecting marine specimens for his dried collection. He intends to study chemical engineering in the Massachusetts Institute of Technology. He takes to science naturally as the grandson of Wilber Brotherton, plant-hybridizing expert.

He faced a barrage of cameras and questions with a pleasant self-assurance which might have been patterned after Lindbergh's. "Nothing doing," he would sometimes say; or, "I don't like to answer that question." Otherwise he spoke quickly, in few words, and kept his interviewers trying to think up new questions.

Before the award was announced a representative of the North American Newspaper Alliance approached all forty-nine boys and offered a substantial sum of money to the winner if he would write a piece for the newspaper. All but two agreed to do so. Huston was one of the two. After the announcement he still refused. He hesitated to write about himself. He thought a long time, puzzling about what was the right thing to do. Finally he wrote a piece. He refused to take any money for it.

By winning the contest, Huston automatically became President of the Forty-Niners, an organization of young men who will be interested to know what becomes of each other and whether the judges were right in their judgment of who was most likely to succeed to the scientific throne of Edison.

In the North American Newspaper Alliance article already referred to, the "brightest boy" said:

"When I was about ten years old I was given a chemical craft set and made my first experiments with it. My interest has grown ever since.

"In high school I did some experimenting in chemistry and electricity, and found a peculiar magnetic effect which I have never had explained to me. I hope to find out some time with further study what the phenomenon is.

"I took a general college preparatory course, but I'm afraid I never studied very hard. I saw a notice of the contest in the newspapers, but entered only when my grandfather urged me to. My grandfather, Wilber Brotherton, has been interested in hybridizing plants.

"My favorite sports (you can't compare your liking for sports and science) are tennis, fencing and swimming.

"I hope to go to the Massachusetts Institute of Technology, and some day be a chemical engineer. As to money, I want only enough to be independent.

"I never expected to win the scholarship contest. I am very happy to have won it and have the opportunity to go to a fine university and make contacts with men foremost in their fields. I'd like to correct an erroneous impression. There is no such thing as a successor to Mr. Edison. That would be impossible, and I am not so foolish as to think there could be.

"The examination given I thought fair, but I found all the questions tough and worked until the last ten minutes of my time.

"I wish more boys could have the same opportunity that I am going to have."

The Professional Motive in Public Utility Management

By DEANE W. MALOTT

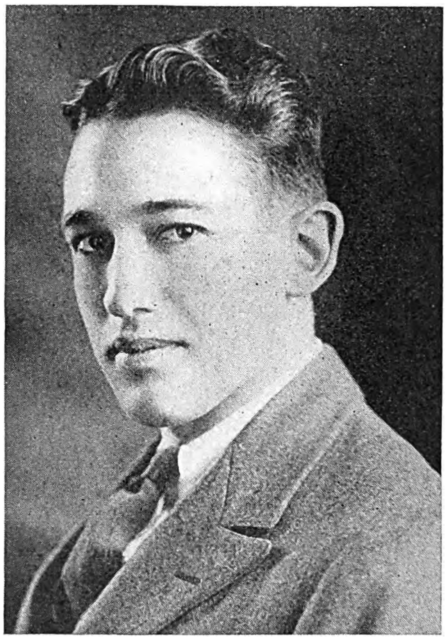
I ASK you to back away from the accounting and administrative problems with which your profession must abound—to retreat so far that the figures of your operating statements and balance sheets fade into oblivion—in order that we may take stock of the direction of your progress, and examine the far horizons toward which this great electric industry, in common with all American business, is heading.

The newspapers today are filled with criticisms and suspicions, and a certain amount of fear that the electric light and power companies have become a species of diabolical octopus which will get out of control and choke the very life of our nation. There are charges of corruption and propaganda, of enormous profits, inflated security prices, and selfish manipulations.

Yet I lay aside my evening paper to switch on the radio, bringing entertainment from distant cities. I note the convenience, the luxury of electric refrigeration, the electric cooker, washer, and ironer, which bring to my family the opportunity of a richer life—and all at a price which I must be willing to pay, or I would not have these conveniences. I am not forced to have them, for, with the exception of electric lighting, there are substitutes in direct competition for all these services.

FROM the telephone at my elbow I can reach any one of millions of individuals, for I am told something like 80 per cent of the entire world's telephones are at my immediate service. I ride through the country late at night and see the twinkling windows of isolated farmhouses, where inside are the comforts of electric lights and other domestic appliances, where the families are served by electric motors for pumping water and doing a dozen other tasks which provide the farmer with greater comforts and easier living. There must be something peculiarly dynamic in these utility industries, something of lasting worth which gives prophecy of even greater service in years to come. Somewhere in the industry constructive imagination of a high order has been at work.

I do not say that there has not been corruption, unhealthy propaganda, and shortsighted self-interest. Undoubtedly there has been, for I have observed that these elements are an inseparable part of every rapidly growing and prosperous industry. But it seems unlikely that an industry of such size could have arisen with these as the dominating motives. Largely, the development of public utilities has been through the corporation, a type of organization which, contrary to popular conception, inevitably tends toward higher ethical standards, with more of a feeling of trusteeship for the public which it serves, as well as for the employee and the security holder. The big corporation stands for stability and permanence rather than for rapid and immediate profits. It is easy for one man in a little shop around the corner to engage in sharp practices. It is far different in a corporation where the individual executive is surrounded by associates whose respect and trust are necessary to his existence. For these corporations are no longer controlled by a few men, nor by bankers. The ownership shares are scattered throughout the land, just like automobiles or electric lights.



Mr. Malott is Assistant Dean of the Harvard School of Business Administration. This address was made before the Fifty-second Convention of the National Electric Light Association, held at Atlantic City, N. J., June 3-7, 1929

In spite of this, considerable uncertainty seems to exist as to the motives of this industry. A part of the uncertainty is the result of a mistaken idea, prevalent both in and outside of the field, that there is essential antagonism between the public on the one hand and the utility operators on the other. A wall has been reared between the two, over which the two sides are making faces at each other. This feeling has tended to aggravate itself in the attempt occasionally made by the utilities to extort a monopoly profit by charging a high unit price for their services. Enlightened economic study, however, has shown that the ideal should be not a high price with resulting high unit profit, which restricts the business, but a low unit profit which will result in a high aggregate profit. Your business is subject to two definite economic laws. One is the law of diminishing costs; the other, of elasticity. The first indicates that unit cost decreases as volume increases. The second indicates that volume increases with a decrease in unit prices. Sound practice, therefore, calls for abandonment of the attempt to collect a monopoly profit which results in a high unit price on a restricted output, because your aggregate profit will be greater if your prices are cut to the limit. You may have seen instances within your own experience of this sort—where price reductions have led to increased consumption and increased profits—but the courage to follow this policy has been all too rare. The Hartford Electric Light Company has recognized these facts with notable success. And, after all, there is nothing in the world more obstinate than a fact.

WITH these economic concepts clearly understood, the barrier wall between utilities and the public largely disappears, and what is good for one is also good for the other. If the utilities' profits result from decreasing price, it is inevitable that the public, as well, receives a profit through the revision.

Europeans tell us that Americans are materialistic, money-mad, ruthless. Hence we have developed sordid tendencies toward the aggregation of wealth which have precluded any finer sensitiveness, and our foreign critics say as a result we have developed no great artists. But are the great business leaders so far removed from the great artists? The artist is one who visualizes the unseen, then through his ability turns vision into reality—on canvas, the printed page, in marble, or in music. Great business men likewise bring dreams to reality. James J. Hill, as a boy sitting on a packing case on the muddy banks of the Missouri River, dreamed of a great Northwest, and he made his dream come true. Theodore N. Vail dreamed of a universal telephone service, and the dream which he projected is reaching fulfillment. Are not these the qualities of the artist—to see things which no one has ever seen before, and then, with rare force and vitality, to convert the vision into reality? Undoubtedly these business leaders—and you have them within your own industry—have the same powers as the artist, though they apply them to a more obstinate material.

BUT, you say, these business leaders have now "arrived"; they have succeeded. Why worry about them at all, for life can hold for them no more. No, that cannot be, for evolution is our supreme law. We live in a dynamic, not a static world; there must be continual change. A professional motive must be found, is being found, I think, to carry these leaders onward. No victorious army ever went into camp, with never another campaign to fight, that it did not at once being to disintegrate. Under these conditions, leadership is impossible.

American business today is at the crossroads. We have mastered the technique of it, developed mass production and mass distribution beyond the point where they have ever been developed in the history of mankind. The development of business with a material aim—the aim of mere size and for a mere profit—cannot go much further. And when the aim of business becomes merely to hold on to what we have, the end is in sight. In the early stages of individual leadership there comes the desire for individual wealth. It is easily satisfied, and a surfeit of money does not bring satisfaction. In Dodsworth, Sinclair Lewis' recent book, this is portrayed forcibly—almost tragically. Then comes the desire to build up a big business, to dominate through sheer size, and still there is no lasting satisfaction. There must come forth, not a materialistic aim, for that has been attained, but a new, an ideal aim, to serve as the objective of progress.

Already we are beginning here and there to see some signs of it. Let me quote from the Annual Report for 1927 of the American Telephone and Telegraph Company, a company which has certainly reached nearly the zenith of materialistic progress and which dominates the field in its own industry. This report says:

"The American Telephone and Telegraph Company accepts its responsibility for a nation-wide service as a public trust. Its duty is to provide the American public with adequate, dependable, and satisfactory telephone service at a reasonable cost.

"Earnings must, of course, be sufficient to permit the best possible telephone service at all times and to provide a reasonable payment to stockholders, with an adequate margin to insure financial safety. Earnings in excess of these requirements will either be spent for the enlargement and improvement of the service furnished, or the rates charged for the service reduced. This is fundamental in the policy of the management."

Men everywhere who are in positions of leadership have come to make their ideal greater than themselves. It is a question with them of what is right, what will contribute most to the permanent welfare of the community. There are exceptions, of course, but if you look at the truly great leaders you will find their goal has absorbed even their interest in themselves. Thomas Edison long ago forgot himself in the pioneering efforts which absorbed his life. With perhaps unattainable ideals of what may be done, Mr. Edison keeps on.

CERTAINLY this is the beginning of a publicly announced ideal aim which will continue the telephone industry's development and prevent a "victorious army" from going into camp.

With this sort of attitude there will develop in this country a body of business men held together by a professional *esprit de corps*. This professional motive is not new—it has dominated many of the older professions for centuries. In the early ages we find it fiercely alive in the religious leaders — Francis of Assisi, Loyola, St. Dominic. There was a considerable measure of it in the early military leaders, such as Charlemagne and Frederick the Great. The old time conquerors were nearly all constructive statesmen. It is new only in application to business which has developed from a means of livelihood to stand for service to the community.

Among men who have vigorous, adventurous lives we have always found a strong tradition, an idealism, which has carried them to their objectives with irresistible force. The men who have followed the sea have been held together by strength of tradition, by an idealism which makes the captain the acknowledged leader. He holds his place by respect rather than force. The great men who followed the sea built up the tradition, which, in turn, served to bolster up the weaker men—a phenomenon no less true in the business world.

In the novels of Joseph Conrad we see the domination of the captain's honor —more important to him by far than his life. In the story called Typhoon we see the traditional professional motive, which never presents alternatives, but drives straight for its objective.

Captain MacWhirr, in appearance an insignificant little runt, is on the deck with Jukes, his mate, in a storm at night which shakes the crazy old steamer from stem to stern. As Conrad tells it: "While Jukes was exchanging explanatory yells with his Captain, a sudden lowering of the darkness came upon the night, falling before their vision like something palpable. It was as if the masked lights of the world had been turned down. Jukes was uncritically glad to have his Captain at hand. It relieved him, as though that man had, by simply coming on deck, taken most of the gale's weight upon his shoulders. Such is the prestige, the privilege and the burden of command.

"Captain MacWhirr could expect no comfort of that sort from anyone on earth—such is the loneliness of command."

Later on and the ship "was being looted with a senseless, destructive fury; trysails torn out from the extra gaskets, double-lashed awnings blown away, bridge swept clean, weather-cloths burst, rails twisted, light-screens smashed — and two of the boats had gone already. They had gone, unheard and unseen, melting, as it were, in the shock and smother of the wave. It was only later, when, upon the white flash of another high sea hurling itself amidships, Jukes had a rapid vision of two pairs of davits leaping black and empty out of the solid blackness, with one overhauled fall flying and an iron-bound block threshing in the wind, that he became aware of what had happened within about three yards of his back.

"He poked his head forward, groping for the ear of his commander. His lips touched it—big, fleshy, very wet. He cried in an agitated tone: 'The boats are going now, sir.'

"And again he heard that voice, distinct and faint, forced and ringing feebly, but with a penetrating effect of quietness in the enormous discord of noises, as if sent out from some remote spot of peace beyond the black wastes of the gale; again he heard a man's voice —the frail and indomitable sound that can be made to carry an infinity of thought, resolution, and purpose, that shall be pronouncing confident words on the last day, when heavens fall and justice is done—and it was crying to him as if from very, very far: 'All right.'"

BEHIND those two words was the leader of men, impregnable in his duty, apart from the ego-centric fears which break the weaker men, MacWhirr sees his duty so clearly bound up in the tradition of the sea—and no danger of the physical universe can daunt him.

But, you say, that is not real, that is only a blind tradition, the sporting instinct. It may be a blind faith, a creed, but there are parallels. The doctor with his professional ideals, the business man urged far beyond the point of perishable financial success, keeps on. Mr. Ford started as a tinker. He made a car which became successful, dominated the market, and he became tremendously wealthy. Did he stop? No, because his ideal was unattainable, infinite. He visioned a cheap and a respectable car within the reach of everyone. That dominating motive drives him on.

Men everywhere who are in positions of leadership have come to make their ideal greater than themselves. It is a question with them of what is right, what will contribute most to the permanent welfare of the community. There are exceptions, of course, but if you look at the truly great leaders you will find their goal has absorbed even their interest in themselves. Thomas Edison long ago forgot himself in the pioneering efforts which absorbed his life. With perhaps unattainable ideals of what may be done, Mr. Edison keeps on.

Great problems confront these leaders and press for solution on every hand. An individual may want to contribute the maximum service, to do what is right, but the decision calls for rare judgment. Owen D. Young, in discussing the golden rule in business, says: "When you discuss what is right in business, the difficulty lies not in determining what is right in principle. It is rather in the application of the principles to the vast, complex problems of our modern business. If you ask me with reference to business what is right in principle, I answer that the golden rule supplies all that a man of business needs. Yet, if you ask me to apply the golden rule to bank rates, I find it amazingly difficult to do. It is like telling me to apply the multiplication table to the design and manufacture of a steam turbine. I know that principles of mathematics underlie the building of that great machine, but it is a highly difficult problem to step from the multiplication table to the steam turbine.

"What is right in business requires, in highly complicated situations, that the golden rule be applied by men of great understanding and knowledge, as well as conscience."

And along with the trusteeship for business itself, our leaders are faced with a great social responsibility. In the midst of materialistic surroundings such as the world has never known, clear-sighted vision and tremendous effort is required, if we are to avoid becoming so highly geared in our physical activities that we lose our sense of poise, our sense of spiritual values. Business leadership must very nearly assume responsibility for our civilization itself if our upward evolution is to continue. Loss of these values, of a necessary perspective, has caused civilizations in the past to disappear. Who will assume the responsibilities of leadership, so greatly needed to maintain the balance? When we look to our ministers, our standard-bearers through the centuries, we find them top-heavy with dogma, the issues often obscured, with a resulting loss of faith on the part of men and women everywhere. The lawyer, formerly the leading citizen, has devoted his abilities so largely to business interests that he is often no longer the leader of affairs—a position which he occupied back in the days of the village squire. The doctor is involved with the great problems of physical ills; the teacher is too often a lonely man, in an airtight compartment, who fails to get a universal picture of the world's problems.

WHO is left? Only a large group of business men, run-of-the-mine and unimaginative, with here and there a great leader. So often the business man has not been urged by professional motives. Self-interest has been his only aim; and he leads his life, busy as a toad under a harrow, agile, but unwitting and ineffective.

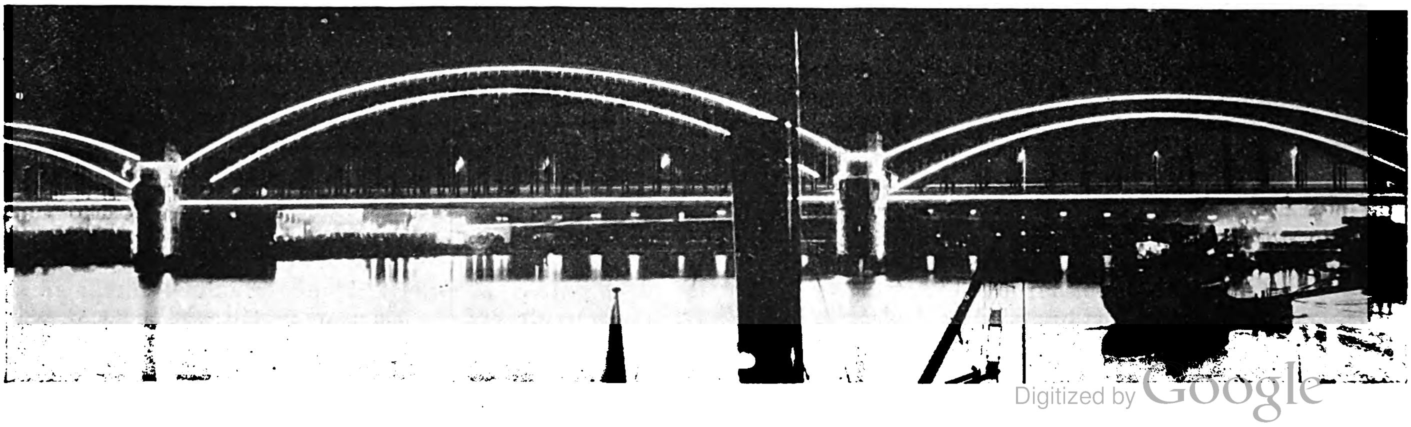
Not all men, indeed, are fitted for this new leadership. Some never get into the ephemeral realm of values, which cannot be measured any more than one can define a beautiful sunset, or a human emotion. One man would drive the horses of the sun. Another is happy driving a push cart. I have heard of a Harvard graduate who tried many occupations without success, and who finally found happiness as a street car conductor. Some think they have found their ideal, when they are merely chasing butterflies.

The very intangibleness of leadership and the professional motives which dominate it keep many from entering its realm. To him who does, however, that same intangibleness gives a thrust to his activity, which drives over mere tangible obstructions; for the professional motive is dominated by an almost mystical faith, where the end of the road is hidden; yet progress is the compass by which the journey is known and charted.

The professional motive is something bigger than the individual who possesses it, something outside of him, which takes possession of him, absorbs him in its inspiration. He acts freely, not under compulsion as a slave or a man with a vicious habit. He willingly and gladly stakes his property and his comfort. It caused a brilliant medical man to spend his life among the Kentucky mountaineers in comparative poverty; it caused a business man to give up a splendid position to become a college administrator; it caused a man like Munsey at the end of life to give his millions to art; and it has caused many a man so to devote himself to his business, so to apply his energies, as to fulfill his dream of a business of maximum service to the community. The sporting element is always present. The professional motive does not calculate, does not weigh chances and risks like a bookmaker at a race or a cock fight. The professional man plants his feet upon a law of the universe, a great ideal, and defies chance, accident and fate.

Charles W. Eliot, one of America's keenest observers of human nature, once wrote: "The gypsy in Asia Minor makes iron nails one at a time with hammer on an anvil, much as his ancestors did before him for hundreds of years. I have seen him doing it; but I also observed that his small children were stark naked and that his larger ones had only one garment. . . . In industry and commerce all things are become new."

The one tradition therefore which we should hold inviolable, is the tradition of constant change. It will inevitably lead in the great industry which you represent, to the adoption of a professional motive on the part of your leaders—a motive which will still further develop your service, and aid in raising the level of our nation.



Behind the Veil

Civilization, Light and the Electric Arc

By ERNEST GREENWOOD

The sixth of a series of articles portraying against a social historic background, the evolution of the electric industry and the chief personalities that have been instrumental in its growth.

THE whole history of civilization has been characterized by the desire of man for more and more light. Ages ago evil spirits became associated with darkness and light became sacred. It has always been a symbol in the religions of the world and nowhere is it better typified than in that ancient Persian faith—Zoroastrianism. The religion of Zoroaster is sometimes called fire worship, but the descendants of the faith—the Parsees—claim that this is erroneous. It sprang up somewhere in the neighborhood of the Caspian Sea and there are still Parsees, or Ghebers, who do reverence to the "eternal flame" at Baku. The Modern Zoroasterians look upon fire as a symbol, or manifestation, of "divine power, purity and essence."

According to this religion, which basically is not so very different from any other religion, the universe was visualized as a great battleground on which Good and Evil were forever struggling for mastery. On the one side was Ahura Mazda—whose name has been made immortal by the Mazda Lamp—the Wise Spirit. His six vassals were: Good Thought, Right Law, Noble Government, Holy Character, Health and Immortality. On the other side was Angra Mainyu, the Lie Demon. Man stood between the two. On the one side was Good, Purity and Light, and on the other Evil, Filth and Darkness. Not a bad creed even when measured by the standards of present day Christian "enlightenment."

Ahura Mazda was the God of Light and was considered as the essence of civilization; in his service there could be no compromise. Zoroaster denounced all the old gods, but claimed that fire was not a god: that it was only a symbol of Ahura Mazda. He erected fire altars, but only as a testimonial to the Wise Spirit.

No one knows where or exactly when man's so-called "civilization" started. It may have been in Babylonia. We do know that somewhere about 4,000 B. C. the cave man's pine torch was succeeded by the hanging fire basket and that—again, perhaps—the burning of fat from roasting animals led to the invention of the oil lamp. The first oil lamp known to history was a crude affair, shaped like a clam shell, open at the top with a narrow place to hold a moss wick. An example of this lamp is now in the Museum of Lighting of the Pacific Gas and Electric Company. Six thousand years ago, Arthur L. Adkins tells us, colored saucer oil lamps were buried in the Pyramids with Egyptian kings to light their way into heaven.

In both Greece and Rome the fire cults of Hestia or Vesta and of Vulcan were a marked feature of religion. In ancient Rome the "Regia" was the sacred center supposed to be the abode of Vesta. If, by any chance, the sacred fire should be extinguished, all business and, in fact, all activities of every kind, stopped. It was thought that the connection between heaven and earth had been broken. During the annual festival of Diana (Vesta) her grove, so Sir J. G. Fraser in the Golden Bough tells us, "shone with a multitude of torches, whose ruddy glow was reflected in the lake; and throughout the breadth and length of Italy the day was kept with holy rites at every domestic hearth . . . someone unknown dedicated a perpetually burning lamp in a little shrine at Nemi for the safety of the Emperor Claudius and his family. The terra cotta lamps which have been discovered in the grove may perhaps have served a like purpose for more humble persons. If so, the analogy of the custom to the Catholic practice of dedicating holy candles in churches, would be obvious."

If we trace our modern religions back we find this same element of fire or light as the symbol of some divine being. With the flight of the Hebrews out of Egypt under the leadership of Moses came the beginnings of the Hebrew religion and with it the foundation of all modern religion for, after all, Jesus, the founder of Christianity, was a Jew. Moses must have been a man of considerable genius and one who thoroughly understood the psychology of a primitive people. He, and his followers with him, believed in one, everliving, personal God to whom they gave the name of Yahveh—or, as we mispronounce it, Jehovah.

In the desert was a volcano known as Sinai, or Horeb, which had been worshipped from time immemorial by a tribe called Kenites. Moses apparently understood that in addition to a fixed belief in a personal God it would be necessary to provide his people with a symbol which they could understand—something familiar to them in their everyday lives. So he led them to the foot of this holy mountain which, no doubt, served well as an altar in the early days of Hebrew worship.

SIR HUMPHRY DAVY

Skipping a few thousand years—and this any historian has a right to do—we find that in the Classical Age about 450 B. C. (150 years after Thales first puzzled over the problem of the electrical attraction of amber) the wealthy class had saucer oil lamps made of bronze instead of clay. Some of these lamps were set upon a two section standard which could be raised and lowered. They were not at all unlike the bridge lamp of today. These lamps were decorated with human, animal, and floral forms. Coming to a later date, I can do no better than quote John W. Lieb, senior vice-president of the New York Edison Company, in an address before the Illuminating Engineering Society in 1916. He said:

> "We are struck by the fact that there is a substantial historical basis for the view that the characteristic phrase, the Dark Ages, used to designate an epoch in history, indicates not merely a period during which the steady advance in civilization of the human race was temporarily checked, but literally also an age of gloom, for the luxury and brilliancy of Greece and Imperial Rome, bringing with it evidences of a desire for adequate illumination, was followed in the so-called Dark Ages by a retrogression to crude and ineffective means for supplying artificial light.
>
> "The Renaissance, with the gorgeousness and sumptuousness of its regal and ducal courts, brought with it also an increased demand for more light, confined largely, at first, to display at brilliant festivals and princely celebrations. About this time the candle first made its appearance, and by its flickering gleams and clustered groupings added mystery and pomp to religious and state ceremonials.
>
> "We have ample evidence in the works of that master mind and extraordinary genius, Leonardo da Vinci, of the attention that was being paid during this time to the providing of bizarre illuminating effects for gorgeous pageants and in the improvement for general interior illumination of the crude lamps, by the addition of chimneys, reflectors and even bull's-eye lenses. In the centuries immediately following, important advances were made in the application of improved burners for oil lamps using animal and vegetable oils, in which connection we recall the familiar names of Argand, Carcel and Hinks. Improved means of feeding the oil to the wick appeared in various forms of pump and clock lamps, of which the moderateur type survives in the still popular so-called student lamp.
>
> "In the early part of the last century, notable progress was made in the field of lighting by oil lamps, due to the impetus given by the discovery of mineral oil, first used as an illuminant in 1853, and giving rise in later years to steady, efficient and powerful oil lamps. The candle industry had also in the meantime been making progress, resulting in the displacement of the old tallow dip and wax candles with the improved stearic acid and parraffine candles, which are still popular for special uses and which have given us our unit value of illuminating effect, the parliamentary standard candle."

In 1400 A. D. Venice and Florence awoke from the Dark Ages and began to encourage art, although science was still suppressed. The Venetian oil lamps did not give any better light than did the lamps of Homer's time and, strangely enough, some of these Venetian lamps are still in use in southern European homes. About 1600 the Betty Lamp (Betty is a corruption of the German word "besser") was brought to America from England and became the everyday Colonial lamp. It had a covered oil pan similar to the saucer lamps of pagan Rome. It was not until 1783 that Argand, a chemist who had invented an oil burner which produced a hollow cylindrical flame, placed a chimney made of a broken bottle around it steadying the flame and causing it to cease smoking. This was the first real contribution to better artificial light in six thousand years.

EARLY in the 17th century—about 1609—artificial gas (what we call manufactured gas as distinguished from natural gas) was discovered by John Baptist van Helmont, a Dutch chemist. Previously he had devoted his researches to alchemy and was among the last of that long line of philosophers who sought to make gold out of baser metals. He turned to chemistry and accidentally discovered artificial gas, which he claimed had been up to that time unknown, was not susceptible of being confined to vessels, nor capable of being produced in a visible body.

Because of the superstitions which surrounded it, progress in the development of gas was slow, and it was not until late in the 18th century that William Murdock, by distilling coal in an iron retort and conducting the gas through tinned and copper tubes, succeeded in lighting his home at Redruth in Cornwall in 1792. In 1798 he built an apparatus on a large scale and lighted the factory of Boulton, Watt and Company, builders of steam engines, with gas. In April, 1802, on the occasion of the celebration of the peace of Amiens—the signing of a treaty by Great Britain with France, Spain and Holland—a public display of the new light was made.

On July 1, 1804, Albert Winsor, a German who obtained the first English patents for gas making purposes, gave an exhibition of gas lighting in the Lyceum Theater, London. The following description which appeared in the *London Times* of July 2 is interesting:

> "Sir Joseph Banks, ever indefatigable in promoting useful discoverings, went last Thursday evening, for the second time, with a large party of his noble and scientific friends to the Lyceum to witness the incredible effects of smoke; the whole theatre was lighted with the same, in a novel and pleasing manner; the arch of lights above the stage had a very striking effect, and from the English grate on the stage (which may be fixed in every room) issued a very brilliant and fanciful light. The products of tar, ammonia and coke were produced and much approved of. Several experiments were made during the course of the lecture, such as boiling a tea kettle and melting ores in a few minutes on a table. It was also proved that a brilliant flame adapted to light houses could be formed, which no rain or storm could extinguish. The noble and learned visitors, after a minute examination of the apparatus, stoves and products, expressed the liveliest satisfaction."

IT was not until 1812, however, that Winsor succeeded in getting a charter from Parliament for his company, the Westminister Gas Light & Coke Company, although in 1807 he obtained financial backing and gave a public exhibition of street lighting. His claims had excited much opposition and he was the object of considerable ridicule. Sir Walter Scott wrote a friend saying: "There is a madman proposing to light London with—what do you think? Why, with smoke." Napoleon, when he heard of the plan, dismissed the idea as *"une grand folie."* Actors in music halls poked fun at him while humorous writers continuously burlesqued him. Nevertheless, he succeeded in establishing the first gas lighting company in the world. The lighting of the streets of London was followed by Baltimore in 1816 and Paris in 1820.

It may seem strange in this day and age that street lighting in America was met, for years, with the most strenuous opposition. It was blocked in Philadelphia until 1836. In New England the proposal to light the streets with gas aroused a storm of protest. Some of the arguments against it, printed in a New England newspaper, which represented the best and most serious thought of the times, were:

1. A theological objection. Artificial illumination is an attempt to interfere with the divine plan of the world which had pre-ordained that it should be dark during the night time.
2. A medical objection. Emanations of illuminating gas are injurious. Lighted streets will incline people to remain late out-of-doors, thus leading to increase of ailments by cold.
3. A moral objection. The fear of darkness will vanish, and drunkeness and depravity increase.
4. Police objection. Horses will be frightened and thieves emboldened.
5. Objections from the people. If streets are illuminated every night such constant illumination will rob festive occasions of their charm.

But even before William Murdock or Albert Winsor were demonstrating the practicability of artificial gas for street lighting, another man — Sir Humphrey Davy, an imminent English chemical philosopher—was conducting a series of experiments destined to eventually eliminate for all time gas as an illuminant, and yet curiously enough dependent on the fact that gas can be made tremendously luminous by an electric spark. His first lecture before the English Royal Society, in which he begins to trace the history of galvanism and describing the different methods of accumulating it, was delivered on April 25, 1801.

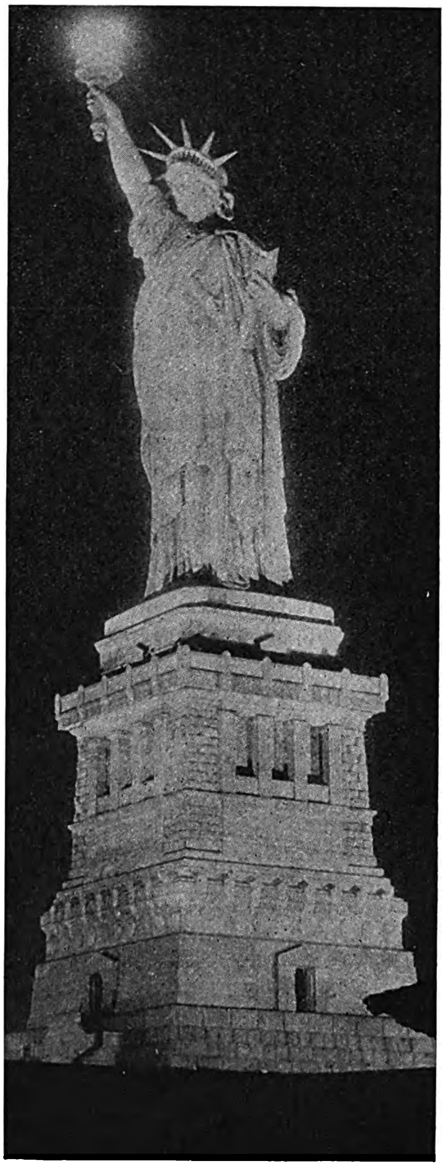
IT has been frequently stated that Davy made his first public display of the electric arc by means of a giant 500 plate galvanic battery in 1813. According to John Davy, in his "Memoirs of the Life of Sir Humphry Davy," this occurred in 1809 or 1810. However, at least ten years before this he had produced an electric "arc," and there were also others who, in the course of electrical experiments, had noticed it. In the *Journal of Paris,* under date of March 12, 1802, will be found the following interesting description:

> "Citizen (E. G.) Robertson, the inventor of the phantasmorgoria (magic lantern) is at present performing some interesting experiments that must doubtless advance our knowledge concerning galvanism. He has just mounted metallic piles to the number of 2500 zinc plates and as many of rosette copper. We shall forthwith speak of his results, as well as of a new experiment that he performed yesterday with two glowing carbons. The first having been placed at the base of a column of 120 zinc and silver elements, and the second communicating with the apex of the pile, they gave at the moment they were united a brilliant spark of an extreme whitness that was seen by the entire society. Citizen Robertson will repeat the experiment on the 25th."

In a memoir by Dr. H. Moyes, of Edinburgh, published in the *Philosophical Magazine* under date of February 1, 1801, will be found the following paragraph: "When the column in question (undoubtedly the carbon column) had reached the height of its power, its sparks were seen by daylight, even when they were made to jump with a piece of carbon held in the hand." In the same volume of this magazine will be found an account of similar investigations made in Germany by Dr. Frulander of Berlin. Davy himself in the *Journal of the Royal Institution,* 1802, describes a few experiments, saying: "When instead of metal, pieces of well calcined carbon were employed, the spark was still larger and of a clear white."

But, according to Mottelay, all of these observations are subsequent to a letter printed in *Nicholson's Journal* for October, 1800, page 150, entitled "Additional Experiments on Galvanic Electricity in a Letter to Mr. Nicholson." The letter is dated Dowry Square, Hotwells, September 22, 1800, and is signed by Humphrey Davy, who at that time was assistant to a Dr. Beddoes of the Philosophical Institution of Bristol. This letter starts out: "Sir—The first experimenters in animal electricity remarked the property that well calcined carbon has of conducting ordinary galvanic action. I have found that this substance possesses the same properties as metallic bodies for the production of the spark when it is used for establishing a communication between the extremities of Signor Volta's pile." So we are forced to conclude that Sir Humphrey knew of the electric arc as early as 1800 and that quite possibly others knew of it even before that time.

Before delving into the history of the arc light which was the forerunner, or ancestor, if you please, of modern electric lighting, it might be well to investigate as to what an arc light really is and whether or not it has the slightest relation to gas lighting. Most folks seem to think that the great brilliancy of the old-fashioned arc light is due to an electric spark passing between the two ends of sticks of carbon. If this were true, then the arc light would have become an instant success as soon as a method of generating current which could be distributed was devised. What Sir Humphrey and various other experimenters did not realize is that the light of the arc is derived either from a vapor column or from a body heated to incandescence by a vapor column.



IN the production of the arc light two rods of gas carbon are brought together momentarily and then separated about one-fourth of an inch. The resistance at the point of contact is so great that some of the carbon is vaporized by the heat produced. This carbon vapor serves as a conductor and forms the arc; the light produced is very intense. It is nothing more or less than an incandescent vapor bridge. In the beginning this was not recognized and, of course, no effort was made to utilize the luminosity of this "vapor column," the incandescent spot of one of the carbons being relied upon for practically the entire light. The arc light, as we know it today, owes most of its luminosity to the vapor column and very little or none to the electrode or carbon.

Although electric lighting may be said to have begun with this early work of Sir Humphry Davy, the production of the arc in his time was only a brilliant and expensive laboratory experiment and, had it not been for the invention of the modern dynamo, would probably have so continued. While he demonstrated it before the members of the Royal Institute in 1809-1810, using soft wood carbon, it was not until 1844 that Foucault, a French physicist, hit upon the idea of replacing the wood carbon with the carbon deposited in gas retorts. By using this form of carbon, which he cut into square sticks, and what was then known as the Bunsen battery, he was able to produce a steady and luminous light. In fact, he was able to use this arc for photographic purposes. It should be noted, however, that, according to the *Journal of the Franklin Institute* for 1843, Professor B. A. Stillman, Jr., and Dr. W. H. Goode, working in the laboratory of Yale, secured photographic impressions using a battery of 500 cells in 1840.

THE Foucault arc light was exhibited publicly in Paris and its use for lighting houses and streets became a matter of much discussion. It could not, however, compete with gas, oil or tallow candles. The lamps had to be controlled by hand (it was not until 1845 that Thomas Wright, of London, devised a lamp in which the carbons were automatically adjusted), and there was great inconvenience attached to the use of batteries. For this reason most of the work done in attempting to introduce the new "light" at this period was evanescent, although much of it was interesting and backed by many persons of influence.

As a matter of fact, the first practical work belongs to this period when an "electric sun" shed its beams upon the stage during the presentation of

Rossini's opera, Moses, at the Paris Opera House. This interior employment of the arc was matched by the Frenchman Deleuil on the Place de la Concorde, where he placed a lamp on the statue of a woman typifying the town of Lille. This caused much public comment, but it was not particularly impressive, as a man had to be constantly present to regulate the lamp by hand. Some time after this exhibition other lamps were set up on the Pont-Neuf over the Seine, on the Arc de Triomphe at the crest of the Champs Elysees, and in the large court of the Palais Royal.

Popular writers, a report of the United States Bureau of the Census dated 1902 tells us, have been accustomed to date the beginning of what then was called the "modern period of arc lighting," dependent upon dynamos as sources of current, from the work of Z. T. Gramme, a Belgian inventor. His first patent was taken out in 1870 and his first dynamo electric machine was submitted to the Academy of Sciences in 1871. But, continues the report:

> "While this view is fair and broadly justified and while the modern central station was founded upon such apparatus, it must not be forgotten that commercial arc lighting had already been accomplished with other types of electric machines; that a vast amount of successful work had already been performed in the prosecution of such apparatus, and that all this machinery was based primarily upon the law or principle discovered by Faraday, according to which, if magnets or coils of wire be constantly moved or displaced in relation to each other, electric currents are set up in the wires or conductors, the quality of the current depending upon the strength and number of the magnets, the velocity and direction of their movements, and the number of coils or the turns of wire in each one of them."

There is much evidence that long before the days of Gramme arc lighting had actually been accomplished on a large scale with older type of apparatus. For example, under the superintendence of Faraday, the Light House Department of England, employing what was known as the Alliance apparatus, devised by Nollet and Van Malderen of Belgium, introduced the electric or arc light in its important beacons at South Foreland and Dungeness, commanding the Straits of Dover. Preliminary trials were made in 1857 and the first beams of an intensive electric arc were thrown across the sea from South Foreland on December 8, 1858, and from the cliffs of Dungeness on June 6, 1862. Strangely enough, the Alliance dynamo which was used had been built originally for the purpose of decomposing water in order to employ the resulting gases in the production of light.

Shortly after the introduction of the Gramme improved dynamo, which gave great stimulus to electric lighting, a new era began on both sides of the Atlantic. In 1876, Jablochkoff patented his arc lamps all over the world, and they were soon seen in both European and American cities. One of the first places in which they were used in this country was in the Wanamaker store in Philadelphia.

But American inventors did not leave the field to foreign competitors. During the closing years of the third quarter of the last century there was an enormous outburst of activity on their part with a corresponding movement in finance and industry. Among the leading workers of this period were Charles F. Brush and Edward Weston, the former working at Cleveland, Ohio, and the latter at Newark, N. J. Both of these men worked along the lines of the development of series arc lighting, and their systems were soon widely introduced both in this country and in Europe. Turning again to the U. S. Bureau of Census for information, we are told:

"The first Brush series arc lights were erected in the public squares of Cleveland, Ohio, in 1879, and shortly thereafter Brush electric lighting companies were started in all the large cities and town of the country, millions of dollars being raised for this purpose, and leading public men associating themselves readily with the enterprises. The first central station operating arc lamps was installed by the California Electric Light Company of San Francisco, in 1879; the Brush system was employed. Neither Europe nor Asia escaped this American influence, for the Brush system was introduced in England at a very early date and companies were organized in Japan and China also." Early efforts were also made to introduce the arc lamp indoors, and in October, 1878, Brush exhibited a small arc lighting dynamo in Boston which later was put into operation in a clothing store for advertising as well as for illuminating purposes.

The success which eventually attended arc lighting, and its adoption for both street and indoor industrial illumination, certainly must have had its effect on the perfecting of the incandescent lamp. We do know that several distinguished inventors on both sides of the Atlantic—notably Swan, Lane-Fox, and Crookes in England, and Edison, Brush, Sawyer and Man, Weston and Maxim in this country—devoted their energies partly or exclusively to this field. The production of a perfect commercial incandescent lamp became a race for a prize of inestimable value. This story of the incandescent will, however, be told in another chapter.

SURGES AND FLASH OVERS

By Fred W. Herbert

Director, Service Department, NELA

The average man smokes two cigars in an evening and never realizes that the electric light he reads by at the time, costs less than one twenty-fifth the price of the cigar.

* * *

A satisfactory alimony is sometimes secured through a correspondence course.

* * *

Would you say that the man who attends a concert and beats time with his foot has music in his sole.

* * *

Lots of women are in business now. The working girl is coming into her own, principally working the men.

* * *

The only business allowed to profit on a skin game is the beauty doctor.

* * *

Of all the ladies in our office the only one we swear before is our notary public.

* * *

They say Boston streets are so very crooked because they were once cow paths. You can still see a lot of calves on the principal streets.

* * *

The Department of Commerce has made extensive surveys for the elimination of wa(i)ste. Girls who want to reduce should get in touch with the department.

* * *

If you can't afford a vacation, sit in the most uncomfortable chair you have, sleep on the hard floor, carry a loaded grip around part of the day, let all the flies and mosquitoes in the bedroom and ants in the ice box, lock the bathroom door, live on canned foods and you will find it is just like camping out, and incidentally save money.

* * *

Nobody performs an act of heroism in the hope of receiving a reward.

* * *

Some of the persons who are always in the public eye are as annoying as grapefruit.

* * *

Responsibilities thrown on us should make us grow, not merely swell.

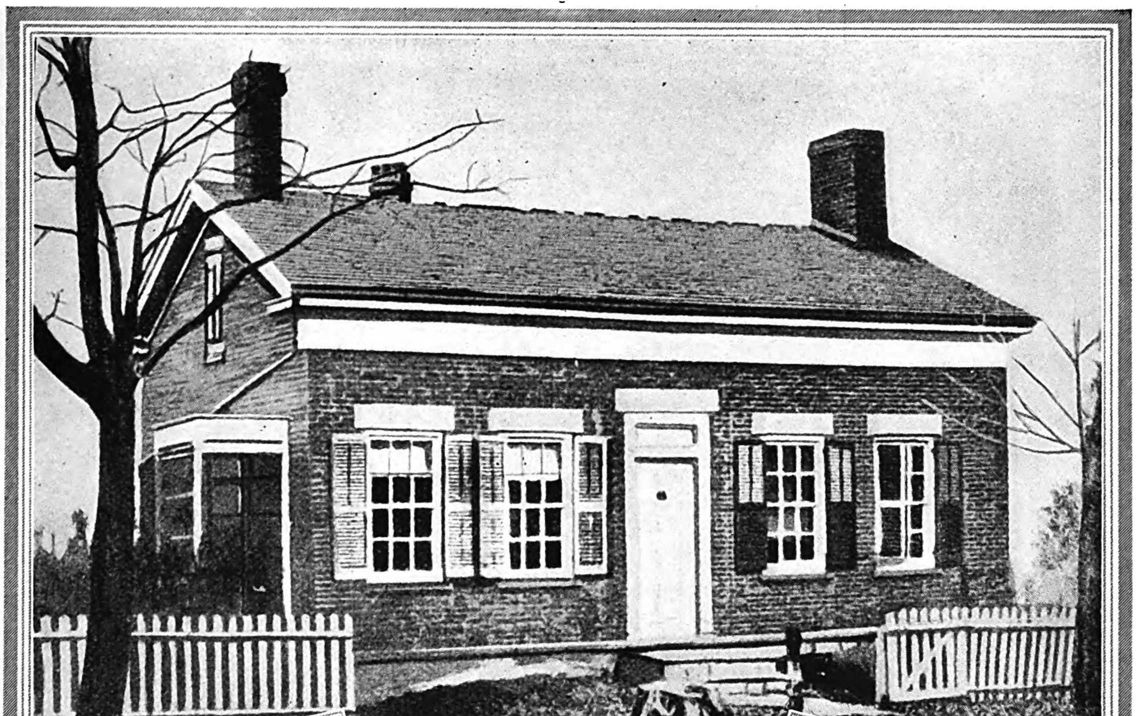
* * *

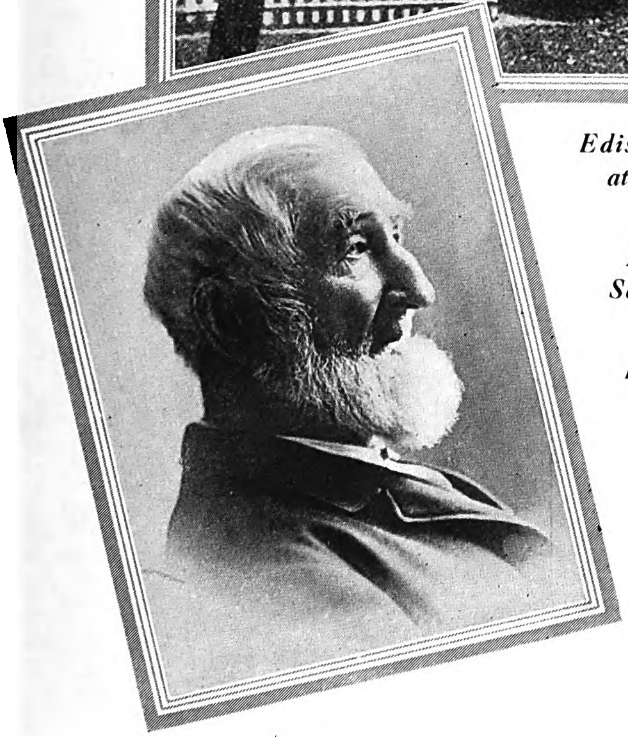
They are now making "rubber parsley" suitable for garnishing meats and foodstuffs in restaurants. It is said this was a Scotchman's idea.

* * *

Hard boiled eggs are yellow inside. When a person is hard boiled you can figure he is about the same as the egg.

THROUGH THE YEARS WITH EDISON





Edison's Birthplace at Milan, Ohio

◆ ◆

His Father, Samuel Edison

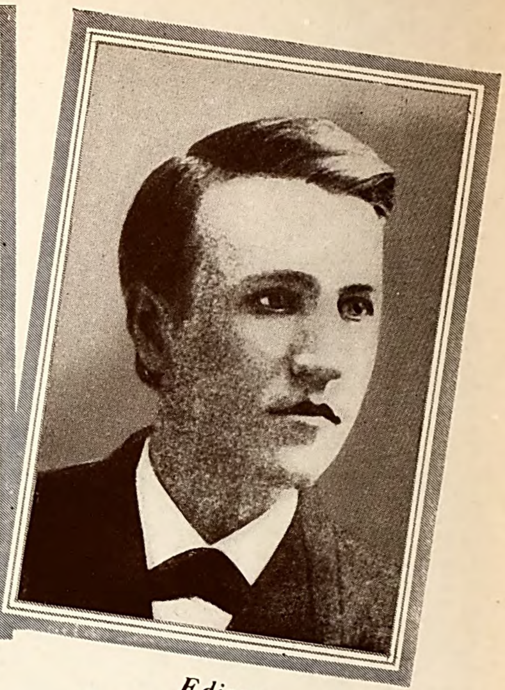
◆ ◆

His Mother, Nancy Elliott Edison

The founder of the Edison family in America came over from Holland in 1730 and settled in New Jersey. Samuel Edison, the father of Thomas spent the first half of his life in Canada, moving to Milan, Ohio, in 1842. In 1828 he married Miss Nancy Elliott, a highly cultured and capable school teacher, the daughter of a Baptist Clergyman of Scotch descent. On February 11th, 1847, Thomas Alva Edison was born in the cottage illustrated on this page. His extraordinary genius for getting at the roots of things was manifested as a child, although his ceaseless questioning caused some to think that he was deficient in powers of comprehension!

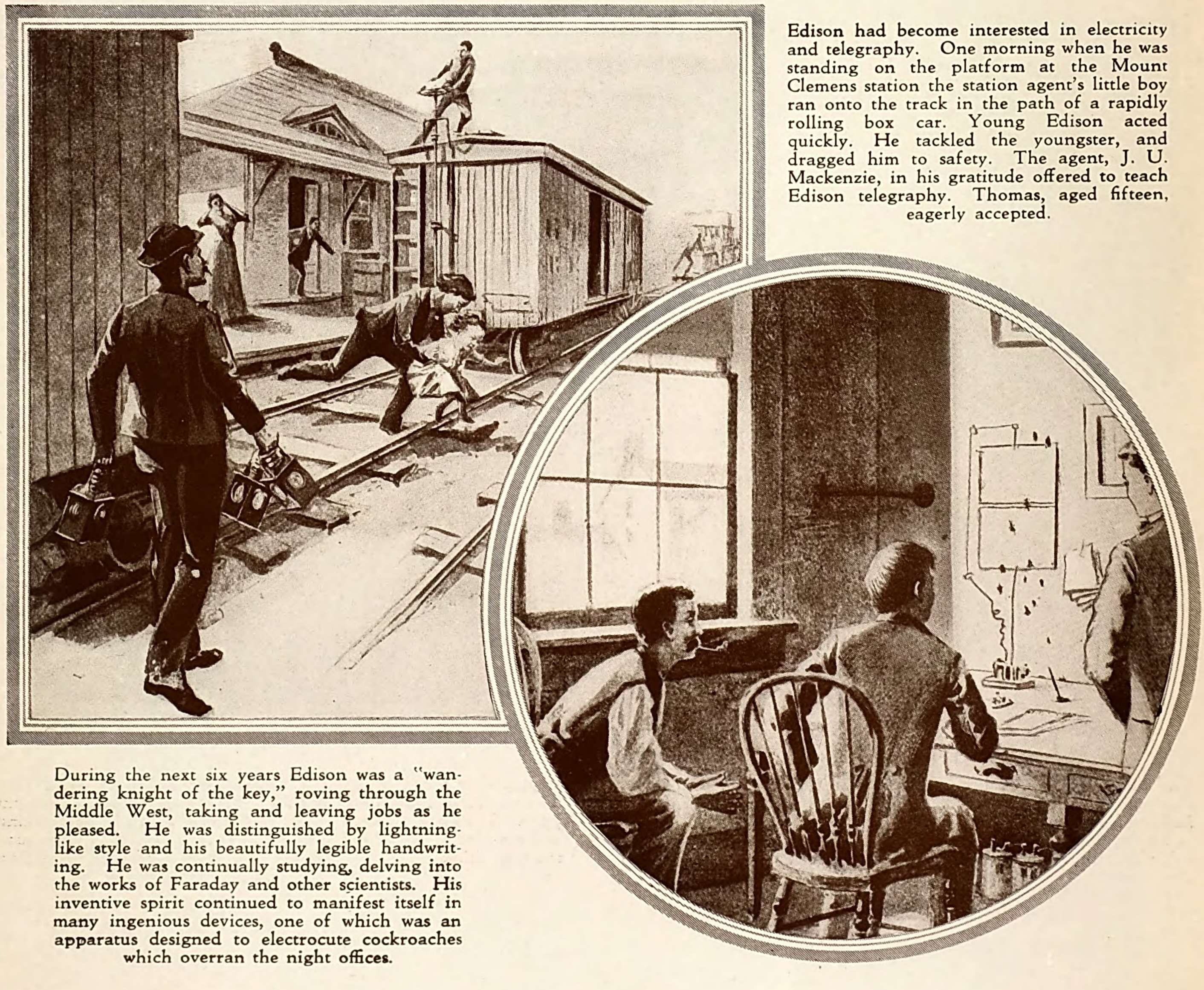
Edison, the Newsboy

At the age of twelve Thomas became a newsboy on the Grand Trunk local between Port Huron and Detroit, Michigan. In the baggage car, where he was given space for storing his papers, candy, etc., he set up a second-hand printing press and started publishing his "Weekly Herald," the first newspaper ever to be printed on a moving train. There, also, was to be found a small experimental laboratory. One day a lurch of the train threw a stick of phosphorus to the floor. It burst into flame. The fire was put out by the baggageman who immediately afterwards ejected the boy and all his paraphernalia, at the same time boxing his ears.



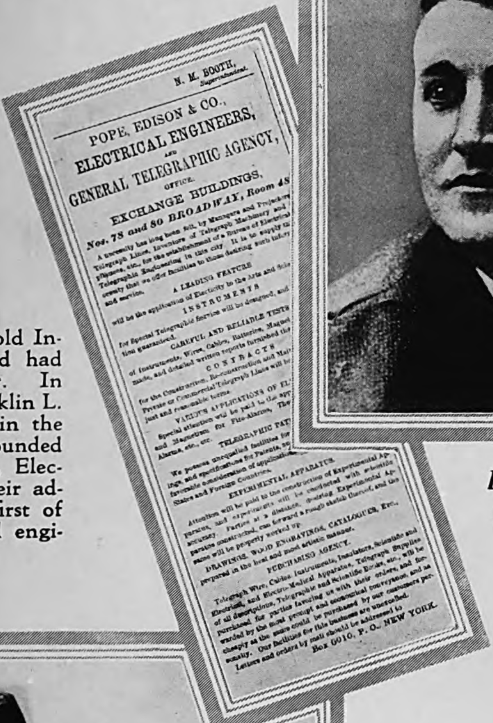
Edison, the Young Telegrapher

Edison had become interested in electricity and telegraphy. One morning when he was standing on the platform at the Mount Clemens station the station agent's little boy ran onto the track in the path of a rapidly rolling box car. Young Edison acted quickly. He tackled the youngster, and dragged him to safety. The agent, J. U. Mackenzie, in his gratitude offered to teach Edison telegraphy. Thomas, aged fifteen, eagerly accepted.



During the next six years Edison was a "wandering knight of the key," roving through the Middle West, taking and leaving jobs as he pleased. He was distinguished by lightning-like style and his beautifully legible handwriting. He was continually studying, delving into the works of Faraday and other scientists. His inventive spirit continued to manifest itself in many ingenious devices, one of which was an apparatus designed to electrocute cockroaches which overran the night offices.

In 1868 when Edison, aged 21, was a telegraph operator in Boston his inventions began with his patented Vote Recorder. This device, by means of which members of a legislative body could register their votes with switches at their desks, was rejected at Washington because it eliminated filibustering, an indispensable part of legislative action. Edison traveled to New York, penniless, and within three days had repaired at a crucial moment the "gold-reporting telegraph" of the Law Gold Indicator Company, and had been made Manager. In partnership with Franklin L. Pope, a young man in the same company, he founded Pope, Edison & Co., Electrical Engineers. Their advertisement was the first of any firm of electrical engineers.



N. M. BOOTH,
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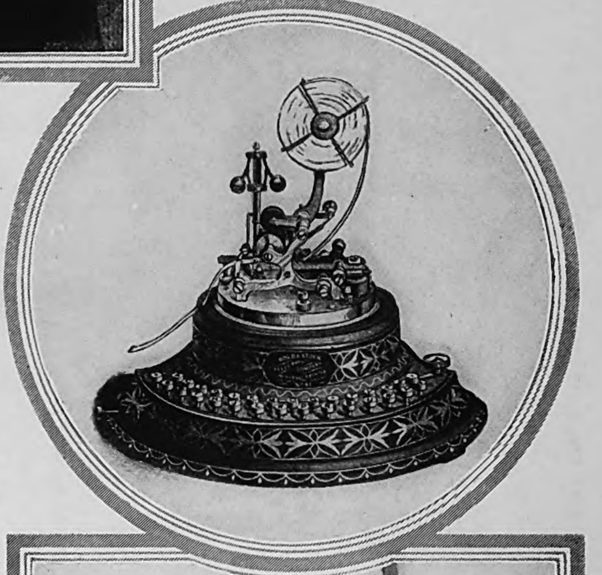
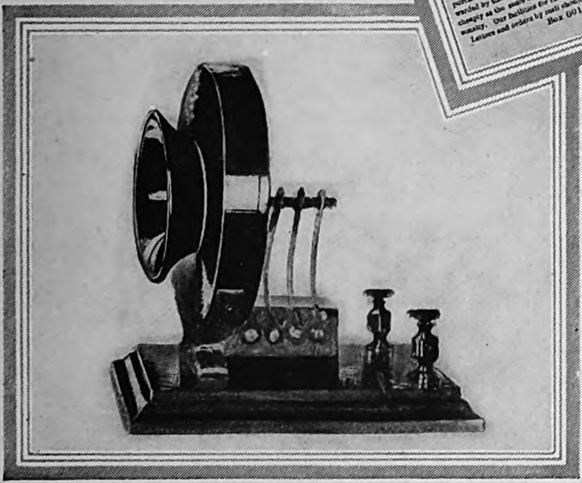
Edison At 24

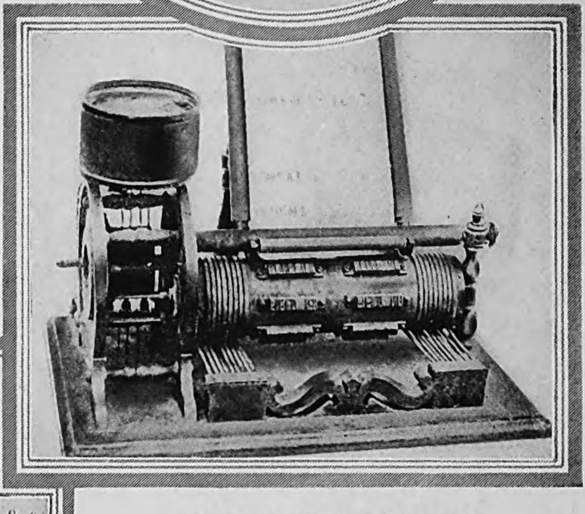
Marshall Lefferts, President of the Western Union, engaged Edison to improve the stock ticker. Edison produced his Universal Printer, which he thought was worth $5,000. He would have taken $3,000. When Lefferts asked him if he would take $40,000 the reports are that he came near fainting. Edison immediately opened a factory in Newark, N. J., and started his twenty-hours-a-day working schedule.



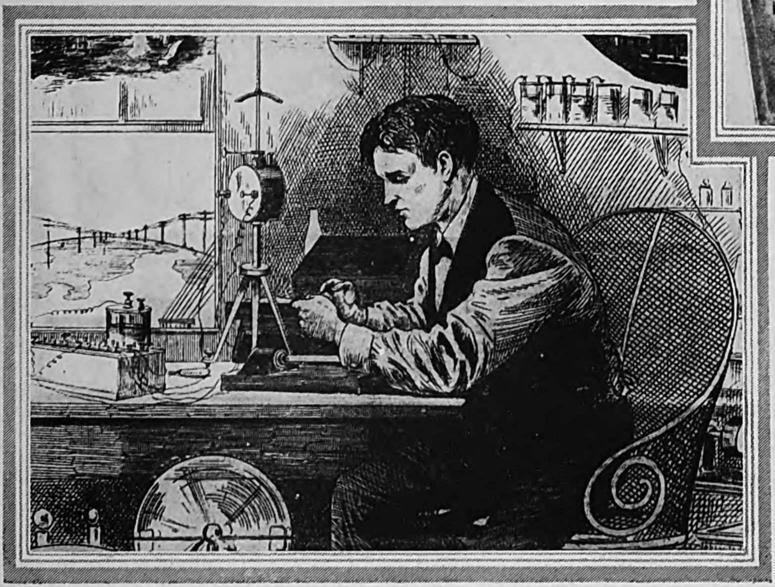
Right—
Edison's
Universal
Printer.



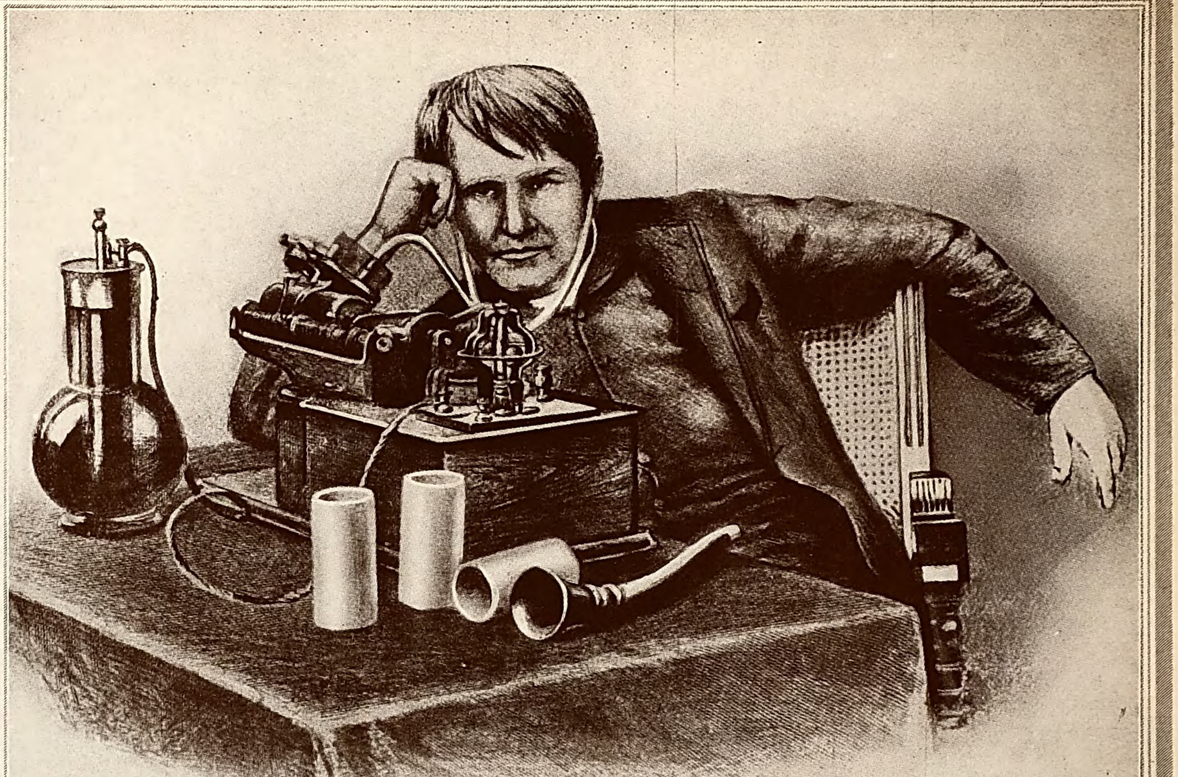
In 1876 Edison invented the Carbon Transmitter, the device that made the telephone possible.



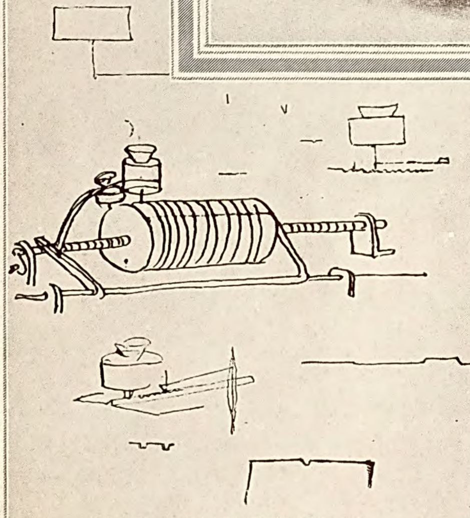
Edison's Vote Recorder



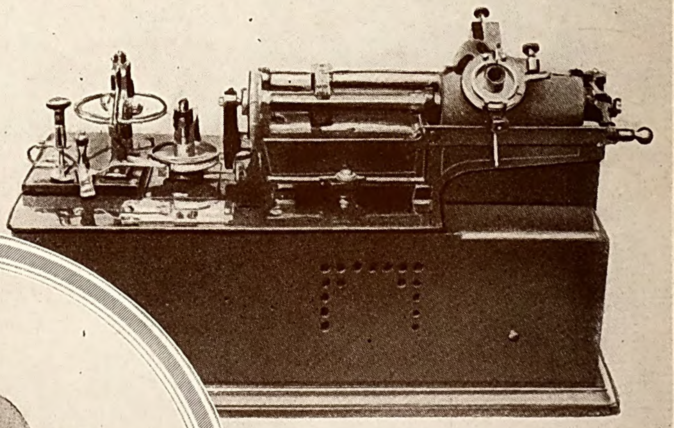
Edison spent the years 1872-1875 developing his duplex and quadruplex telegraph systems. The latter system makes it possible for four messages to be sent along the same wire at the same time, and is Edison's most important contribution to telegraphy.



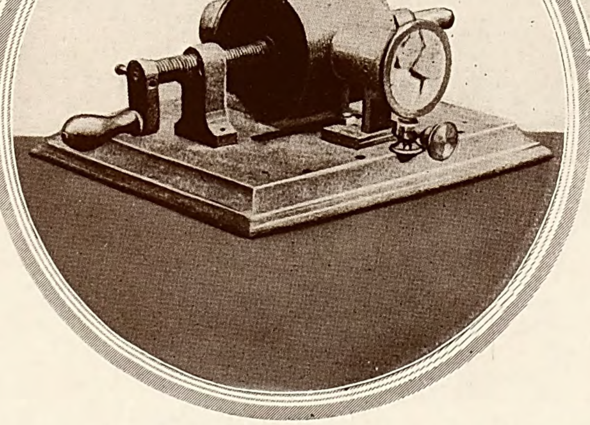
Edison After Five Days and Nights Work With His Phonograph



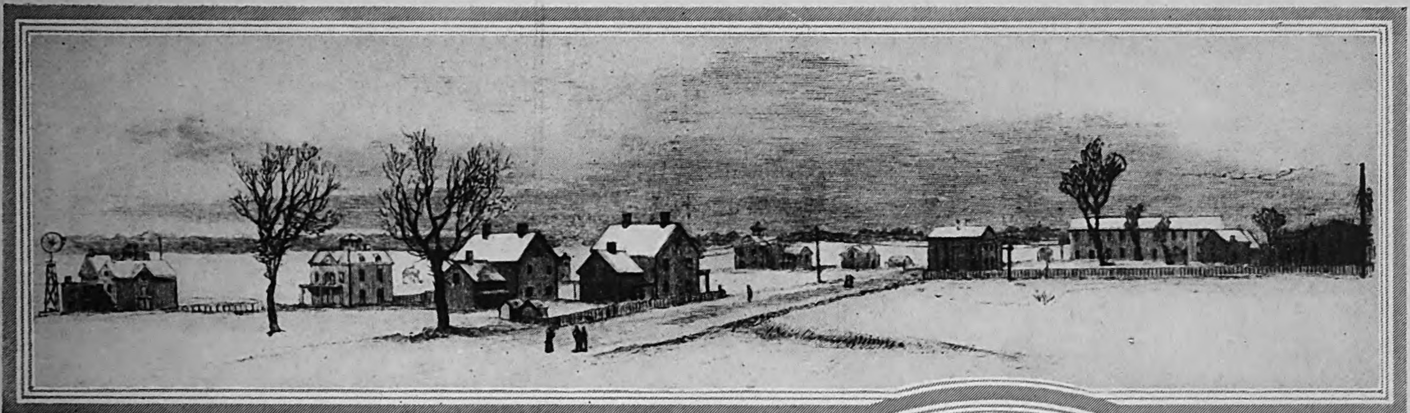
EDISON'S FIRST SKETCH OF THE PHONOGRAPH



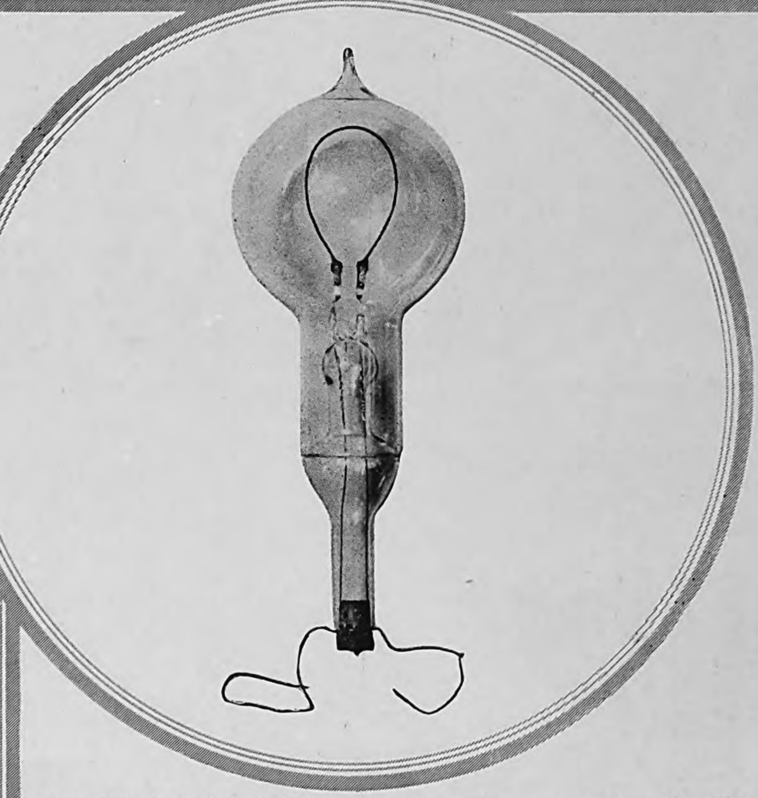
An Early Phonograph



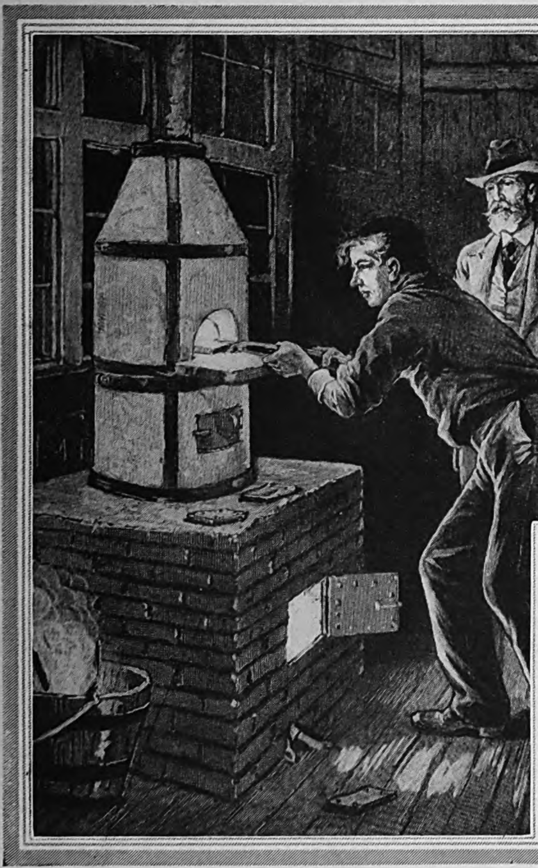
Edison now had plenty of money with which to conduct his experiments. He moved to Menlo Park, New Jersey, where he set up a laboratory. His next idea was that of the phonograph. He made a crude drawing, and submitted it to Kreusi, one of his assistants, with the order, "Make this." Edison himself had little faith that the first model (shown at left) would work. When it audibly reproduced "Mary had a little lamb" he was delighted. He worked hard on this, a favorite invention, and on June 16, 1888, he completed a session of five days and nights of steady work with the assurance that his machine was a practical success. The phonograph brought Edison world-wide fame. Special trains were run to Menlo Park. Edison visited the White House. The Emperor Wilhelm demonstrated the phonograph in Berlin.



Menlo Park, N. J., (shown above—Laboratory on right) was the scene of Edison's greatest conquest. Late in the year 1877 he conceived the idea of an incandescent lamp that would burn brightly, use little current, and be independent of other lamps in the circuit. In other words, he was trying to make an electric light that would replace gas, the problem also calling for a solution of "the subdivision of the electric light." Within a year he had his laboratory fitted out and fifty excellent assistants.

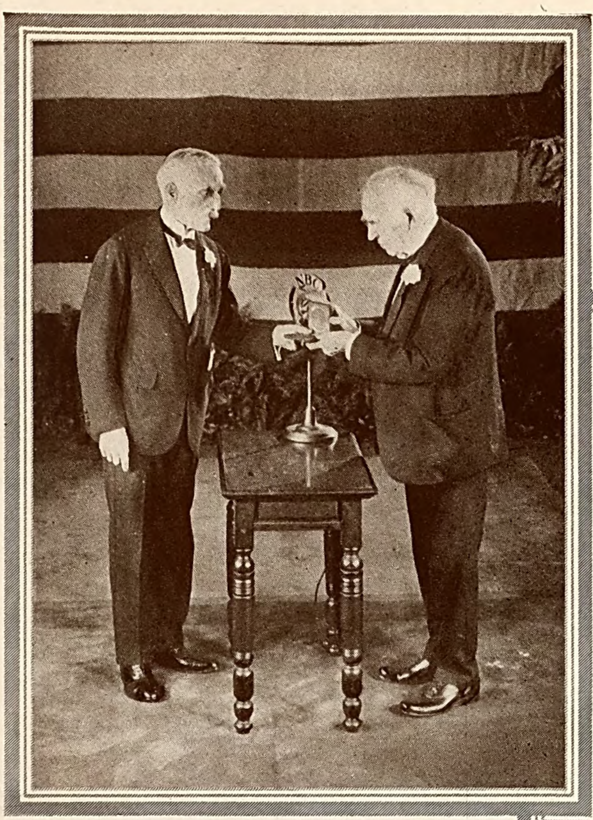


Model of Edison's First Successful Lamp of Oct. 21, 1879



For the filaments of his lamps Edison desired an incandescing substance with high resistance and small radiating surface. He fixed on carbon as the proper material, and he himself made more than 16,000 tests, carbonizing various materials in a small furnace (above). On October 21, 1879, Edison turned the current on in a lamp consisting of a carbonized cotton thread in as perfect a vacuum as he could produce. The lamp burned forty hours, and Edison knew that at last he had succeeded.

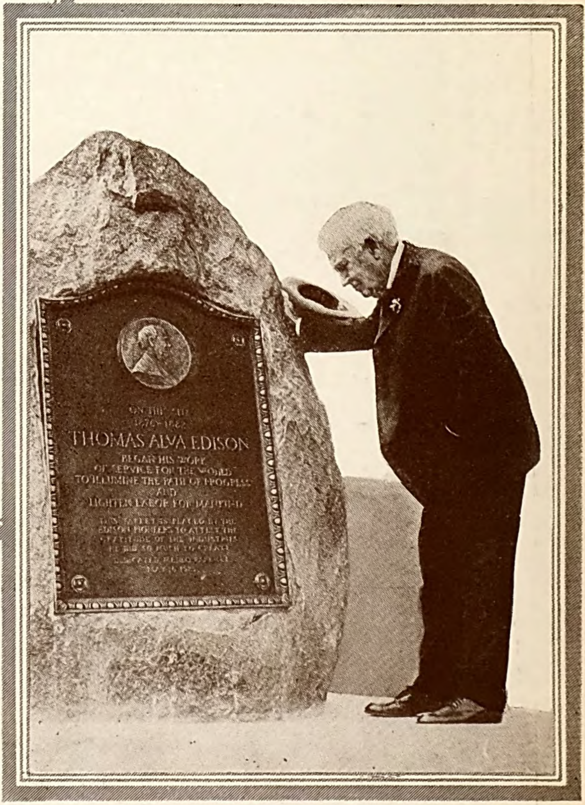
Edison and His Chief Assistants in Front of the Menlo Park Laboratory—1879



Edison Receiving Congressional Medal from Secretary of the Treasury, Andrew Mellon—Oct. 20, 1928

This amazing man, now in his 82nd year, is not content to rest with his many achievements. He still works from 16 to 18 hours a day. At present his chief interest is in the discovery or hybridizing of a plant that will produce rubber in commercial quantities in the United States. Besides the Congressional Medal, Edison has received a great number of decorations and tokens of esteem from almost every country in the world. He is keenly alive to all that is happening in the world. Perhaps the greatest of his pleasures is the encouragement of talent and genius in the younger generation.

Edison Working in His Orange, N. J., Laboratory (Above) With Henry Ford (Left)



Tablet Dedicated to Edison by Edison Pioneers, Menlo Park, May 16, 1925

Acknowledgment

The illustrations were taken from various periodicals and books, including "Edison, His Life and Inventions," by Dyer, Martin and Meadowcroft; "Edison, The Man and His Work," by George S. Bryan, Leslie's Weekly; *and from the New York Public Library, K. L. Dickson, and General Electric Photograph Bureau. The captions are by A. R. Hilliard.*

Henry L. Doherty Prize Paper

Investment Merit of the Electric Utility Industry

By EVERETT W. VILETT

THE prosperity of the electric light and power industry is due in no part to the willingness of investors to advance funds for continual improvement and expansion of service facilities. To continue the industry's success, operating and financing policies must be followed which will react to the favor of creditors, shareholders, and consumers, as needed capital has been and must continue in the future to be obtained from a competitive market where there are many attractive investment opportunities.

The investor, in considering the committing of his capital to the employment of the electric light and power industry, must judge its merits on past performance and future possibilities. To do so requires his intelligent analysis of all factors, operating, political and financial affecting the future, and the application to the net result of a measure of investment quality that will establish the industry's position among other investment possibilities.

General Investment Considerations

To present an attractive field for investment, the electric light and power industry must continue to satisfy fundamental investment requirements. Analysis to determine investment merit of the industry shows among other things, whether: service is in demand by consumers and is liable to continue in favor; management is by responsible people in conformity with existing legal regulations; revenues are sufficient to provide for business expenses, and a suitable return on necessary capital; operating expenses are low enough to enable meeting indirect as well as direct competition; capitalization is on a conservative basis so that after taking care of fixed indebtedness having a prior claim on earnings, there will be left a sufficient amount to properly compensate other security holders; dividend policies are justified by earnings; accounting methods are followed which will bring to light any weakness in the business; the maintenance and retirement provisions are properly cared for so that assets are protected. Individual securities must give protection to the capital of the investor, yield a fair return, and be readily marketable without causing sacrifice in case the investor wishes to sell.

The winner of the Henry L. Doherty prize award for 1928-1929 is a graduate of Massachusetts Institute of Technology and has done graduate study in Banking and Finance at New York University. Mr. Vilett has served the Public Service Electric & Gas Company of New Jersey since 1922 as Cadet Engineer, Engineer in Electric Distribution Department, and at present is Assistant in the office of Assistant to the President

Public Utilities

The public utility field in including such essential industries as those furnishing electric, gas, water, telephone and transportation services, has proven itself to be built on sound principles making for investment merit to securities. These industries, in supplying necessities, are affected with a public interest, and service is therefore usually given under some form of franchise. Direct competitors, for the most part, are thereby eliminated, these utility companies exercising a monopoly in their particular territory. Growth follows that of the communities served, and steady demand and growth result in a steady rate of return on capital invested. The utility business has the advantage of being conducted on practically a cash basis, and a very small amount of investment is tied up in inventories which might be affected by commodity price changes. Due to the privilege of territorial monopoly, such public utility companies are subject to regulation by State Utility Commissions and are allowed by them to operate under rates sufficient to properly compensate capital.

Electric Light and Power Industry

Considering the electric light and power industry in its various aspects, it may be seen to be outstanding among public utility enterprises due, among other things, to its fast rate of growth, to its present great size, and its remarkable prospects for the continuance of expansion. While population in the United States increases yearly at a rate of from 1½ to 2 per cent and industrial growth is at a rate of from 3 to 4 per cent, the electric light and power industry has grown at the annual rate of 10 per cent for the last several years. This compares in the utility field with 6 per cent for the manufactured gas business, 2 per cent for water supply, 10 per cent for telephone, telegraph and cable companies, and a decline for electric railway companies.

It is estimated that the present investment in the electric utility industry is over $10,000,000,000, being exceeded only by that in agriculture, steam railroads and the oil-producing and refining industry. Capital expenditures are averaging around $800,000,000 per year. From 1922 to 1928 there was a 100 per cent increase in the number of kilowatt-hours produced, an increase of 82 per cent in gross revenues and of 81 per cent in the number of customers served. Such increases would be of little importance to the investor if a corresponding decline were immediately anticipated, but the present outlook is for a continuance of growth for many years to come.

Future Prospects for Growth

It is expected that in the next five years total capital investment will increase by nearly one-third and gross receipts by more than one-half. Such expectations are entirely within reason when analysis is made of the present state of electrical development. Approximately a third of the people in the United States still live in houses which are not wired for electricity. Average consumption per home is only about 400 kilowatt-hours per year, and if completely equipped with electrical appliances this would be increased even more than ten times. Use of electrical house heating plants, refrigerators, radios, water heaters and ranges has barely started, not to consider the enormous fields for the more ordinary electric iron, percolator, toaster, washer, vacuum cleaner, fan, etc.

At present the central station industry serves less than half the nation's power needs. Individual plants still generate about 27 per cent, and another 25 per cent is not electrified. Total power requirements have been increasing at the rate of over one million horsepower per year for the last several years, and this increase, together with the electrification of present mechanical power, assures the electric utility industry of an increasing demand.

Railroad electrification, including now about one per cent of the total mileage, has only started, and it promises to be an ever-increasing load. If present cases furnish a precedent, this large energy requirement will be served by the electric light and power companies, as they can unquestionably give the service at both a saving to the railroads and a profit to themselves.

Lighting of streets, highways and airways is in a state of rapid development, and in places where lighting now exists, intensities are being increased.

The public has become "electrically minded," and the industry is viewed with the utmost regard by its consumers. New applications for the use of electrical energy are continually being announced, the end appearing nowhere in sight. If it were not for these new applications, a saturation point might be foreseen where demand, while continually increasing, would do so at a constantly lessening rate. Present estimates do not contemplate any marked change in rate of growth in the next five to ten years, and beyond that predictions of energy consumption, where there is such rapid development, would be little more than an unsubstantiated guess. The outcome of past estimates, however, has been that even optimistic predictions have been exceeded.

Stability of Revenues

There is a considerable diversity of risk in an investment in the electric utility industry, due to the varying character of applications, ranging from domestic to highly specialized industrial usage. General business conditions and total electric kilowatt-hour consumption follow very similar curves, but it is of considerable importance to the investor to realize that residential and commercial use of energy is quite constant, regardless of the prosperity of industry, and although industrial demand does at times fall off somewhat, due to general or local business depression, the loss is in energy sold at lowest rates, the total income of the electric utility company remaining relatively stable.

Operating Economics

The investment merit of the industry has been increased, due to the continual improvement of facilities, to allow greater economy of operation. While other commodity costs were steadily increasing, rates for electricity decreased. This has been brought about to a large extent through engineering developments. In 1919 an average of 3.2 lbs. of coal was required for every kilowatt-hour of electrical energy generated. In 1928 the average was 1.76 lbs. and the newer plants operate on coal rates approximating 1 pound. That there is still room for improvement is apparent in that the most efficient present-day plants convert less than one-quarter of the heat energy in the coal into electricity. Not many years ago low-pressure steam was inefficiently used in cumbersome reciprocating engines. Today plants operate at steam pressures as high as 1400 lbs. per square inch, and energy is generated in highly efficient turbo-generators. Research by manufacturers and operators is constantly bringing improved methods and apparatus into use. It is hardly to be expected that in the near future major and revolutionary changes will be made to greatly cut the cost of production but rather will there be continual slight improvements in efficiencies and in methods that, in the aggregate, will decrease operating expenses.

The increasing demand for electrical energy also favors decreasing unit operating cost, as energy in large amounts is generated more efficiently and at less expense than is possible where generating equipment must be in small units. Decreased cost allows reduction in rates to consumers, further stimulating use of energy. At present the capacity of the plants of the Electric Light and Power Industry is being used to its limit only a few hours a day, and for the rest of the time a large percentage is standing ready to operate, but idle for lack of demand. Increasing application of the use of energy in so-called "off-peak" hours is producing further economies which tend to reduce operating cost. Increase of the hours of use of the plant and therefore the use of the investment is a major problem confronting the industry. Intensive sales programs and readjustments of rates are gradually bringing about the desired result, but there is much yet to be anticipated. The trend is toward economy, and the investor and the consumer will both share the profit.

Adversely affecting operating expenses, although to a much lesser degree than the favorable factors, is the increasing cost of labor and supervisory help in operating the generating and distributing plant. This is the same in all industry, the electric light and power business being no exception, but it is more fortunate than others in that the total labor cost is only a small percentage of the operating expenses.

Personnel

A factor of vital importance to the success of the industry and therefore to be considered by the investor, is the character of the personnel. Due to very rapid expansion, it has been necessary for the Electric Light and Power Industry to constantly add to its operating and supervisory forces. Opportunity for advancement has been excellent, and as a result there has been attracted an aggressive and alert personnel of the highest order, assuring future good management of operation.

Interconnection

Of major importance in the effecting of operating economies is the present practice of inter-connecting the transmission systems of adjacent companies. The time of maximum demand for energy quite often differs between companies, due to difference in type of load served. Operating alone, each company makes an investment sufficient to cover its maximum requirement, together with necessary spare apparatus. Through interconnection and due to the diversity in time of maximum demand, energy can be drawn at the time of one company's maximum from otherwise idle equipment of the cooperating company. Installation of generating equipment is therefore made unnecessary within the limits of the amount of capacity available through interconnection, better utilization being made of the existing equipment. Less spare equipment is required, as the cooperating company can be called on in emergency, assuring continuity of service to customers due to the increased source of energy. Individual plants which operate at lowest cost in interconnected systems can also be operated to capacity, allowing high-cost plants to turn out a minimum of the energy generated. Through interconnection, economical development and complete utilization of water power, otherwise not feasible, due to seasonal flow of water or to location, can be made by bringing this energy within the general network to supplement steam-generated power.

Offsetting the saving of interconnection is the expense of transmission lines and switching equipment so that anticipated economies have to be sufficient to warrant these expeditures. There is also the difficulty of bringing managements together on share of costs and savings to be conceded each company, and as a result interconnection contracts are often very complicated instruments. Mergers and exercise of control by groups with a "community of interest" are tending to bring into being all possible economies of cooperative operation.

Hydro-Electric Development

General hydro-electric development is not progressing at the rate of steam installations. Investment costs in developing water-power sources have increased greatly, operating costs remaining about level, whereas the operating costs of steam plants have shown the marked reduction mentioned above. Logical sites still to be developed are those some distance from load centers, and investment in transmission lines becomes a major consideration. There are generally many political factors to be considered in hydro-electric development, and capital is therefore less ready to assume investment risk where the project is to be hedged about with restrictions. The possibility of hydro-electric power allowing major economies in electrical production is not very probable for some time to come.

Financial Structure

The Electric Light and Power Industry is similar to other public utilities, but differs from other types of enterprise in that the investment in fixed assets is very large compared with the annual income and in the fact that the continuous growth of the industry is constantly requiring additional investment which must be provided largely through new capital. Service is given to consumers at rates such that the gross income is sufficient to cover all expenses and allow a fair return, generally considered as 8 per cent on the investment. This is, in effect, service at cost, for in all industries interest on investment is considered a cost. For each dollar of annual gross income there is an investment of from four to five dollars, the total revenue received from sales therefore being only a 20 to 25 per cent return on the investment. After deducting from this the amount required for operating expenses, taxes, depreciation, etc., and for necessary remuneration of capital, very little remains as surplus to provide for future expansion. This differs greatly from industrial enterprises, where capital is turned over many times a year, and a large surplus can be built up on a small margin of profit, allowing a minimum of new financing to keep up with the growth.

As a result of this characteristic of the electric utility business, new issues are marketed as the industry grows. In 1927 these new issues totaled $2,128,000,000, and in 1928, $1,641,000,000. In 1928 sales were divided approximately as follows:

Mortgage Bonds	27%
Debentures and Notes	29%
Preferred Stock	16%
Common Stock	17%
Stock Sales Direct to Customers	11%
	100%

Forty-four per cent of the total was stock, and it is interesting to note that this compares with about 28 per cent in 1927, indicating the present trend toward stock financing. Reduction in the percentage of maturing securities marketed is continually improving the capital structure of the industry by decreasing the proportion of securities outstanding having a prior claim on earnings.

The spread and average yield of the various classes of securities sold in 1928 were as follows:

		Average
Mortgage Bonds	4.40 to 6.50%	4.69%
Debentures	4.73 to 6.50%	5.22%
Notes	5.00 to 6.17%	5.17%
Preferred Stock	5.00 to 7.21%	5.74%

That capital can be attracted on a basis as favorable as the above shows the high regard in which the investing public holds the Electric Light and Power Industry.

Of particular interest to investors is the large distribution of securities of electric utilities which has been attained in recent years. The policy of selling stock to customers and employees since 1914 has resulted in very nearly 1,800,000 transactions, and although there are many transactions which represent increase in holdings by individuals, the number gives some idea of the extent of those directly holding securities. This wide distribution not only has had a stabilizing influence on security prices, but has brought into being a large group interested in the development of the industry. Public understanding of the economic and political problems before the industry has been furthered and confidence shown in the success of private enterprise.

A new demand for preferred stocks and debentures was brought about in 1928 by the passage in New York State of an act legalizing these issues for certain classes of investment. Life insurance companies under this act may now legally extend their investments to include preferred and guaranteed stocks where earnings meet certain established requirements. This new demand for stocks has undoubtedly had its effect in changing the trend of recent finacing, from bonds to stocks.

The demand for seasoned securities has brought the investment trusts and other institutional buyers into the market for electric utility securities. Banks and industrial establishments also find it profitable to so invest their surplus funds. The removal of securities from day to day transactions, due to holding them for control or permanent investment and the increasing demand for them by such large investors has increased prices and given greater stability to the securities. The ordinary investor may feel confident that the professional is buying electric light and power securities because of their real investment character.

Political Considerations

The fact that the Electric Light and Power Industry is subject to a degree of government control and that present agitation forecasts a possibility of increase, rather than lessening, of that control is of considerable interest to the investor.

The economies of non-competitive operation of electric systems have been so apparent that the industry is in the class of "natural monopolies." To compete with other companies would necessitate considerable duplication of generating plant; would cut down the "load factor" or degree of utilization of equipment, and cause energy to be generated in smaller and less efficient units; would necessitate lining streets and highways with duplicate pole lines; and in many ways create expense which would be reflected in higher cost of service to the consumer.

State Utility Regulation

At first, regulation of electric utility companies was accomplished by a franchise, granted by the municipality, under which certain requirements as to rates and service were to be fulfilled in exchange for the exclusive privilege of providing service.

Economics forces dictated the expansion of companies to absorb nearby plants and to extend into territory outside municipal boundary lines, so that state-wide regulation followed as a natural consequence. With the exception of Delaware, which is at present considering the matter, all states now have commissions appointed to regulate various operating utilities, including the electric light and power companies. This regulation does not assume the function of management, but rather acts as a protection to the consumers and to the purchasers of securities, so that manipulation and irregularities cannot be effected by management and, in turn, protects the companies' interests in so far as unjustified attacks on rates and policies require investigation and decision.

The powers and duties of regulatory

commissions in the different states vary somewhat, but in general their object is to see that the utilities offer a satisfactory service at a rate which will give, but not exceed, a fair return on the capital invested. This allows adjustment of rates, either up or down as required, so that capital is protected and the fair costs of service are met.

It is necessary for the utility commissions in approving rates to establish a "rate base" or legitimate valuation of the property used in serving the public, the value determined limiting the allowable earnings to the amount on which a fair return may be earned. Precedent will undoubtedly establish a method of evaluating a property, but up to the present time there has been considerable difference of opinion as to the underlying principles involved. Methods have been used varying from the use of original cost, deducting for depreciation, which gives a very low valuation, to that of using the cost of reproducing at present-day prices a new and modern facility to perform the same service. Use of present day rather than original cost has been the more common in rate valuations. In a period of rising labor and commodity prices this has proven advantageous to the utility companies and investors, in that allowance is made for the change in purchasing power of the dollar, property value and allowable return changing accordingly.

The investor also receives protection through the utility commissions in that they must pass on all new issues of securities. In so doing they must necessarily investigate the purpose for issuing the securities, the amount of funds that can be profitably employed at a fair return for the purpose in question, the character of securities proposed, and whether rights of other security holders are infringed by the new issues.

Such investigation and approval pretty definitely assures the investor of the soundness of the issues in question. In addition, utilities are required to keep their accounts according to a uniform method, and reports which are available for public inspection must be filed periodically, so that data on financial condition is available and is in such form that it may be readily compared with that of other companies.

Due to the powers granted to public Utility Commissions, which, if exercised judiciously, are to the advantage of the investor, there is also an inherent possibility of danger. An over zealous commission more acquainted with politics than economics might attempt the enforcing of rates for the sale of energy which would jeopardize the position of the capital invested. Some such cases have occurred, and appeal taken to the courts has universally met with the decision, in accordance with the Constitution of the United States, that property cannot be confiscated without giving proper compensation. In the cutting of rates to the point where a fair return cannot be earned on the value of the property, an act of confiscation results and a readjustment of rates has been considered permissible.

The holding company form of control of electric operating companies, which is treated in greater detail later, has caused agitation in some states to bring these companies under the control of State commissions. The New York State Commission has recently led the way in recommending that its powers be increased so that: holding companies will be required to file annual and periodic reports; the commission may investigate the relationship between holding companies and operating utilities; the commission may inquire into the cost and profit accruing to non-utility companies which control public utilities; and that a legal definition of a holding company be given as those corporations which control operating utilities not only through stock ownership, but also through leases or operating contracts and by control through voting trustees.

Further broadening of state utility commission powers in such manner would possibly be of some disadvantage to investors through the commission tending to exercise more of a hand in actual management than is now the case. In turn, advantage would accrue through bringing about statements of earnings of operating companies which could in no way be manipulated, and if any excess profits were being earned, reduction in rates to consumers would undoubtedly further stimulate consumption of energy, so that income would still allow an attractive return to the investors.

There is a definite tendency toward such broadening of state commission powers, although many major problems must first be settled. It is to be anticipated that in some states powers will be increased, and if actually fulfilling expectations will probably receive rather general state-wide application.

Federal Regulation

Under the holding company form of organization the great majority of operating companies are controlled by corporations with activities in more than one state. In a few cases the operating companies are also engaged in transmission of energy across state boundary lines in what might be defined as interstate commerce.

Individuals and organizations of the belief that state regulation is insufficient have sought Federal legislation to provide a superimposed Federal regulation over that already existing in the separate states. The investigation of the electric light and power industry instigated by the United States Senate and now being made by the Federal Trade Commission, will be the basis of proving in or out the advisability of such legislation. At the present time the investigation has disclosed little of importance from an investor's viewpoint, and it would appear that it will be drawn out over a considerable period before any recommendations based on disclosures of the investigation can be formulated in an attempt at legislation.

The danger of politically hampering the natural development of an industry which so intimately serves the public with actual necessities has brought together a large group in the interest of the state commissions, the utility companies and the holders of utility securities, so that the probability of legislation which could in any way curtail the natural development of the electric industry along economic lines seems out of the question.

There are individuals who see in the success of the Electric Light and Power Industry and its security holders the opportunity for making political capital and for the attainment of considerable personal publicity through making statements adverse to the industry's welfare. Persons of radical mind often do perform a service in bringing to the fore situations which otherwise, for lack of attention, would not come into public view. To expect, however, that a decided minority can hope to bring about legislative changes which would injure the normal development of an economic force in present-day civilization, would be to lose faith in the intelligence of the public and their representatives responsible for legislation. Any changes that are made will undoubtedly be in the interest of greater development of the industry and its service, and not adverse to the holders of Electric Light and Power securities.

Government Ownership

There is also the threat of Government ownership which is continually brought up by the politically minded, who see in the Electric Light and Power Industry a chance to put political bureaus in charge of the operation of a highly specialized business. They feel, or at least are not hesitant to state, that large sums may be saved the consumers of electric energy if only the Electric Utility management can be politically controlled.

Fortunately such sentiment is decidedly in the minority, although in sections socialistically inclined there will undoubtedly be sufficient sentiment of this kind to continually keep it with us. A most conclusive proof that it is not to the consumer's advantage is obtained in comparing average revenue per kilowatt hour for electricity generated in municipal and private plants. In 1902 such a comparison shows municipal plants receiving approximately 8 per cent more per kilowatt hour than those under private operation. Twenty years later municipal plants showed an increased average unit revenue of some 26 per cent, while the privately operated plants showed a decrease of 30 per cent, municipal unit revenue being almost twice that of the private plants. It is inherently uneconomic to produce and distribute electrical energy through individual plants such as most of those operated by municipalities. In 1927 there were 187 and in 1928, 152 municipal plants taken over by private systems, this adequately representing the trend away from municipal operation.

The operation of electric systems on a large scale by governmental bodies is no more to be thought of than would be a return of the railroads to Government control after experiencing that control some few years ago. Governments fundamentally exist to do for their individual citizens what those citizens cannot do for themselves, and in exercising the normal and expected function of preserving public safety and order, and determining general lines of social policy, they are not also well adapted to conducting large business enterprises. Private enterprise is more progressive, less inclined to be slow of action, and in the end can give the public greater service than could any bureaucratic control.

The fact that the presidential election of 1928 established in effect the opinion of the voting public in favor of private enterprise, rather than public control, is a very good assurance to the investor that Government ownership and operation will make little headway.

Management

Successful enterprise has for its foundation and principal asset good management. In the final analysis investments are primarily made in men as leaders of enterprise and in the strength and character of those leaders is the strength of the investment.

The Electric Light and Power Industry in the United States, from its first operations under Mr. Edison and his associates, to the present day, has been favored with excellent management. Evidencing this is the fact that one is unable to find a single instance of default among the financial obligations of companies doing solely an Electric Light and Power business. An analysis of companies with gross earnings of over $1,500,000 per year, the combined capitalization of which represents more than 90 per cent of the industry, shows that current cash dividends are being paid on all first preferred stocks and in no case are there accumulated back dividends.

Management of the industry has been successful in directing cooperative effort of science and finance. Great strides have been made on the side of science but only because financing has been possible. In the early stages of expansion and until not many years ago the industry had considerable difficulty in procuring funds. Equipment manufacturers close to operating companies accepted preferred stocks in payment for apparatus, but it is notable that dividend rates of around 8 per cent represented their estimate of the element of risk. Management has since demonstrated its ability, the credit standing of the industry today being such that preferred stock issues at rates as low as 5 per cent have been successfully marketed. In keeping the industry prosperous and in building up a healthy financial record, a strong foundation has been laid for the inevitable expansion of the future.

Control

With control in the hands of local groups, capital could be attracted from rather a limited field. Large operation with large security issues offered improved investment character and a broadened market for security issues. Added diversity of investment, and improved credit standing were possible through operation of properties serving varied industries in separated sections of the country. Due to these factors, the holding company form of organization and financing came into being, these companies selling their own securities to the public and using the proceeds in procuring control of operating companies. Companies which previously could not hope to attract capital were able, on advances from the holding company, to successfully expand and make available better service. In protection of this financing and in the interest of economical operation, the holding companies gave advice in matters of policy and engineering. Separate functions of the industry, such as management, finance, specialized engineering and operation, previously existing in independent and uncoordinated enterprises were combined as obviously better accomplishment could be made through cooperative effort with one unified purpose. Management, controlled as to allowable return on investment in operating companies, received compensation for its efforts in perfecting necessary supplementary enterprises, and although holding company form of control has been subject to attack on this account, it has amply justified its existence through economies in operation which have allowed reduction in rates to consumers, and made available increased earnings for investors.

The benefits of cooperative enterprises have by no means been exhausted, the present being an era of mergers and consolidations of existing operating and holding company groups, to take advantage of further possible economies. The public mind has been greatly influenced by utility grouping to the extent that we have progressed from a "trust busting" period to one of "big business," and railroad, industrial and financial grouping has met with favor largely through the successful precedent the utilities have established.

Analysis of the position of holding companies from the investor's point of view is very difficult. They hold little or no physical property, but rather stocks and bonds of operating companies. Against such assets their own financing must be done through collateral trust notes or stocks secured by the earning power of the securities owned.

Earning statements are difficult of analysis as statements of each underlying company require examination to ascertain actual condition of the group. In turn, however, each of the operating companies controlled is functioning under a State utility commission so that its position may be taken as sound. The industry is well established and holding company securities are backed by those of operating companies. Record of accomplishment in the great proportion of cases is excellent and investment merit is high.

The investor in either the operating or holding company must consider the men controlling his funds and invest in the industry, in that part of the controlling structure, and in that type of security, which fits his purpose. Rapidly expanding holding companies may prove even stronger than those of conservative policies or than established operating companies. Investments in holding companies, however, while having some advantages not applying to operating companies, and while they are fundamentally investments in the Electric Light and Power Industry, are more investments in men and management than is the case of investments in operating companies, and securities must be rated accordingly.

Conclusion

The investor in reviewing the position of the Electric Light and Power Industry can well feel that it offers sound investment merit. The industry is well established in providing an essential service to individuals and business enterprises, and has possibility of future development that even exceeds the possibilities of growth in population and wealth of the United States. The outlook is for better utilization of present investment through new applications for the use of electrical energy and for

(Coninued on page 624)

Teaching Electricity

A British Viewpoint

From an Article in the Electrical Review (London)

ELECTRICITY in the school curriculum is not a suggestion; it is a necessity. The time has come when compulsory lessons in elementary electricity are as essential to the growing generation as lessons in civics and morals. To realize this, it is only necessary to consider how vital electricity has become in everyday life, and how deeply and thoroughly it has permeated the entire social and national fabric. Although the definition of electricity has so far proved an unsolvable riddle to engineers and scientists, all are aware of the illimitable benefits it confers on mankind, and that today it ranks as the most vital factor in improving the standard of living, and in adding to the comforts of all and sundry.

It does, or can, provide our homes with heat, our factories with power, and our homes, shops, factories, streets and even roads with light. It forms the basis of the telephone, wireless, and innumerable other conveniences of modern civilized life, which add so much to our comfort, or deduct so much from our daily expenditure of energy.

It is axiomatic that if any radical reform in the social code is to be effected, the simplest and most successful method is by inculcating it into the minds of the younger generation. It is not suggested that a radical reform in electricity is necessary, but there is a necessity for a wider utilization of its benefits, and a greater realization of its potential possibilities.

Let us see first why electricity should be taught in the schools—then how it should be taught—and finally—what results we might reasonably expect from its teaching. Electricity has become part of "our daily bread." It touches the life of each individual in so many different spheres than an elementary knowledge of it should be in the possession of all.

In every field of activity where it has been applied, its beneficial influences have been conclusively proved. Its wider adoption is only limited or retarded by the "electrical" ignorance and indifference of the ordinary public. It spells advancement, and there seems to be ingrained in the human make-up a conservatism against all forms of advancement. Such conservatism can only be overcome by education—not, as many erroneously believe, by "push" sales methods or extravagant and indiscriminate advertising—and the obvious place to apply this education is in the primary schools.

If a general conception of electricity and its uses were implanted in the juvenile mind, it would be the first and most important step in eradicating conservatism, overcoming the present widespread indifference, and would tend to produce enthusiastic crusaders in the cause of electricity.

It is not a "dry" subject, and if properly presented, would prove so interesting that the young student would be anxious to delve deeper into its secrets and possibilities. We have only mastered the rudiments of electricity, and while present advancement is certainly rapid, it would be many times more so, if universal electrical education were adopted.

It is necessary that the public should be educated in regard to the cost of electricity, for the average man in the street does not view this matter in the correct perspective. Let teaching follow the line that the cheapness of electricity cannot be judged solely by pound, shilling, penny standards, but by standards of life, of comfort, and of convenience, for the supply of electricity is not a commodity but a service, and that service which attains nearest to perfection in modern civilized life.

The main thing is not to teach the growing generation "electricity" but to teach it to think electrically and to live electrically. The more essential and simple elementary facts should be taught, but the main programme should deal with what electricity is doing for mankind, what it can do for mankind, and what it will do for mankind.

Stress should be laid on those little everyday applications of electricity which add so greatly to our comfort, convenience and amusement; on those bigger applications in commercial and industrial life, which add so greatly to our national wealth and have proved so vital in raising the standard of living of all grades of society; and on those finer applications in medical science and similar spheres, which are doing so much to alleviate suffering and to increase the individual and national welfare.

The inclusion of this extra subject will not lay a great burden on the teaching profession, for it is not suggested that any attempt should be made to impart technical knowledge of electricity to primary school children. Many of the leading men in the electrical world would not consider it beneath their dignity to compile for the guidance of teachers a small book which would adequately meet the requirements without loading it with terms or technical knowledge, which would confound the juvenile mind.

The direct result of this electrical education would be the gradual and sure eliminating of the universal indifference, replaced by an enthusiasm for everything electrical. A wider knowledge would lead to the wider adoption of electrical methods with increased demand for electricity and electrical appliances. This is what all branches of the electrical industry are clamoring for, through all kinds of societies, committees, and advertising channels. *The wider application of electricity will inevitably result in cheaper electrical supply and cheaper appliances. This is what the public is waiting for.*

National interest would be a vital force in stabilizing the electrical industry, which, by virtue of its innumerable ramification is, or should be, the most vital industry to the nation.

Indirectly, this education will give an impetus to electrical research, invention and development, and it is difficult to anticipate just where electricity will stand when the present generation has grown to manhood. It is sufficient that it will be imbued with the electrical idea; and will be ever ready to contribute in all ways to this branch of science, which has already proved so vital to modern civilization.

H. M. Byllesby Prize Paper

Six Words in an Accountant's Life

BALANCE USEFUL CONTROL RESEARCH
REPORTS PERSONALITY

By WILLIAM A. O'NEILL

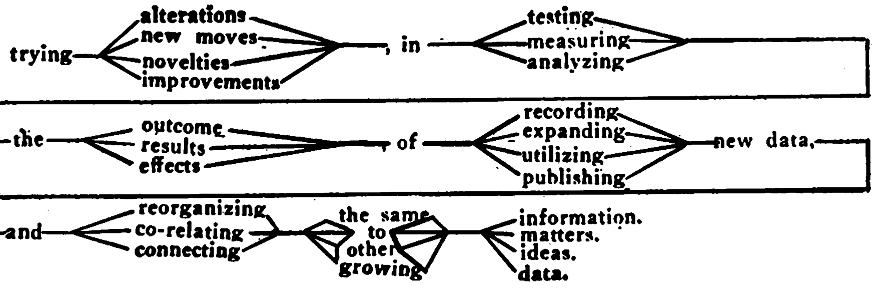
"BALANCE" is a word that has been associated with the functions of accounting, in the mind of the average person, since 1492, when Luca Paciolo wrote the first treatise on double-entry bookkeeping. From that time until the early part of this century the business man was pleased, perhaps I might say relieved, when he was informed, "The books are in balance." Today, the word has slight significance in our industry for the reason that every one in authority, at the very least, expects the books to be in balance. We need no more positive proof for this statement that the question propounded in the H. M. Byllesby Award,—"How to increase the usefulness of the accountant in the public utility industry?" Certainly, those of us whose privilege it is to serve in the accounting field of our industry should feel grateful over the knowledge that Colonel Byllesby not only thought of us as being useful, but left his associates sufficiently inspired, with the result that they now desire to increase our usefulness.

In view of the fact that accounting embraces both the fields of Art and Science, I sought the opinions of men associated with our industry (in these fields), with the hope that their views might be found not only interesting but profitable to my fellow accountants.

Dr. Willis R. Whitney, asked how he thought the accountant could increase his usefulness, wrote and diagrammed:

"Increased usefulness can be brought about first and forever by being intelligently dissatisfied and appreciative of the possible assets in change, because this is everywhere a growing, improving world. Change is the surest thing we know, so expect and participate in the changes.

"Usefulness can be increased by—



Mr. O'Neill's paper won the 1928-29 *H. M. Byllesby first prize award. Mr. O'Neill has been with the Electric Bond & Share Company, New York, since* 1923. *His accounting experience has ranged through the mercantile, coal mining, automobile and public utility fields.*

"'Usefulness' cannot usually be anticipated. By trying new combinations of old data, some combinations are found interesting, then desirable and then indispensable. So do not wait until you know the need for something, but try the effect first. No one wanted radio—it was tried first. So was induction, so was X-ray and so was steam."

Dr. Whitney closed his letter with a real message to all accountants. He states: *"This attempt shows you how far I am from knowing accounting, but I know it's mixed up with change because everything else in the universe is."* I shall leave Dr. Whitney's thought provoking message with you without further comment.

Control

So we come to the word "Control'—a word that I trust will retain always a prominent place in the vocabulary of our accountants. The force of the word was brought home when I asked a man who is in the first ranks of the operating field—"How may we be more useful in our industry?" He said: "The accountant must learn more about the business—he must not be content with balancing accounts, he must know the physical facts making up the accounts—in effect, he must have the accounts under CONTROL." When asked—"Why more of us did not reach the top?"—he replied; "Perhaps you allow the figures to control you, rather than you controlling them." Certainly, there is food for reflection in this friendly suggestion. How many times have we been asked:

What is your annual gross revenue?
What is your annual operating expense?
What is the population of your town?
How many customers do you have?
How many employes do you have in the office?
What day do you close your records?
What class of securities does your company have?

And to our questioner's surprise, we have to refer to a report for the answer. Yet we will go home and expect our children to master ten or twenty lines of Latin verse in one day, or a part in a play in one week—while we, because we are thinking in the terms of balance in place of control, have not acquainted ourselves with the ordinary physical facts that surround our daily work.

May I, at this point, offer a suggestion? Some evening after the office has closed and you are alone with your own thoughts—ask yourself: How much control do I have over the pay roll, the purchase and stores, the cash and the customers' records? Am I able to tell the story that these records contain by the fifth of each month? How many entries do I develop from these records, that I do not know the full reason for their being made? Has the purpose of the entries been fulfilled? If you can answer these questions, then it is fair to assume that your records are under control—if you cannot, then you should seek the cooperation of your associates in the "operating," "engineering," "merchandising," "rate" and "statistical" departments, so that their requirements can be incorporated into a workable scheme of control.

When we have reached the stage where we have "Control," then we can strive, in the language of Dr. Whitney, —to become increasingly useful—which brings us to a word that has for too long a time been neglected by the accountant, "Research."

Research

Do you think it would be overstating the case if it is suggested that practically all of the research work undertaken to date in the field of accounting has been done with the thought in mind of solving specific problems? We have not attempted to follow the example of the chemist or the engineer in making fundamental, scientific investigations into the science of accounting, without respect to their practical applications. As a general rule, we try to visualize some goal we wish to reach and then lay our plans accordingly. I would like to see the accountant borrow a few thoughts from the field of Pure Science. To illustrate this point, I shall quote from the address of Irving Langmuir on January 13, 1928, at the time he was presented with the Perkins Medal, which address was reprinted in the April 1928, issue of the N.E.L.A. BULLETIN. At the same time I suggest that if you have not read the article, do so, as it contains many pertinent suggestions that should be useful to the accountant.

Dr. Langmuir, in speaking of the types of men who are best qualified for scientific investigation, says:

> Then, too, the best type of research man does not like to be told too definitely what must be the object of his experiments. To him scientific curiosity is a greater incentive than the hope of commercially useful results. Fortunately, however, with proper encouragement, their curiosity itself is a guide that may lead to fundamental discoveries, and this may solve the *specific problems* in still *better ways* than *could have been reached by a direct attack.*

At another point he stated:

> "I believe in the near future there will be a much increased demand for men with scientific training who are capable of doing more independent thinking."

Certainly this statement holds as true in the field of accounting as in chemical research. Dr. Langmuir deals in an interesting fashion with an important adjunct of research when he states:

> "Our schools and universities devote so much effort to imparting information to students that they almost neglect the far more important function of teaching the student how to get for himself what knowledge of any subject he may need."

He goes on to say:

> "Much of the knowledge of data upon which these principles depend and other necessary information should be obtained through *experimentation* and *individual reading.*"

Summed up, if we learn these lessons outlined by Dr. Langmuir, we are bound to be stimulated to a healthy interest in mastering the principles of our business and then building our methods, systems and reports accordingly.

Some may ask at this point—How can the accountant do the research unless he has a goal for each problem? I suggest but a few matters that can be profitably researched, not for the purpose of saving a definite amount of money, but to learn if the methods and practices in vogue have kept pace with the changing conditions:

> *Classification of Accounts*—Of what benefit is it to a company to analyze continually month in and month out operating revenues and operating expenses of a small town or community in the same manner and detail as is done for a large city? What would happen in your particular company if you reduced the classification of operating expense and fixed capital accounts, say 50 per cent, but increased your knowledge of the sources of revenues?
>
> *Merchandise and Jobbing*—As it is practiced in other industries as a guide to our own problems.
>
> *Automobile Operation and Control.*
>
> *Cooperation with the Field Force*—How much could the accountant learn about payroll distribution or stores control, if he took a month off and labored with the line or construction gang?

If the accountant never saved a penny as a result of approaching these problems in this fashion, I hazard the guess that he would, nevertheless, be doing what my operating friend suggested—"Learning more about the business."

If we have *balanced* our records, are in *control* of the original source of information, have instituted the practice of *research,* then it appears safe to assume that we are in a position to discuss the fifth word in our treatise, "Reports."

Reports

Elizabeth Luther Cary in a review of several papers, on Metropolitan Museum Studies, dealing with Greek Art, and Photography, states:

> "Care and scrupulous accuracy more often than not carry with them an intellectual quality in statement which even the reader uneducated in the special subject discussed finds himself first respecting and later enjoying."

The day I read this review there came to my mind—"What are we accountants doing to make our reports—our monthly letters, read as they should—are we telling the romance of the business? Its victories—its weaknesses—its improvements—its hopes for the future, in a language that will interest our associates. If not, we should, for when all is said and done the reports should not be technical in character. They should be such that each man charged with a definite responsibility may find the guide to the solution of his problem. That is our function as accountants—accounting by itself is of no value. In our business, an accountant reaches the peak of his service if he can complete reports that do not have to be interpreted by him. In effect, his service is paradoxical in that the less he has to be summoned to answer questions regarding the reports he completes, the more valuable he becomes to the organization. Therefore, we should strive always to make the reports interesting. You have known men who will sit up half the night reading a detective or mystery story, and if the truth were known, these stories are not half as interesting as a running story of the construction of a transmission line through the mountains, or the development of a hydro site along the Missouri River, or the rehabilitation of a system in the flooded area of the Mississippi.

Mrs. Anna Steese Richardson, director of Good Citizenship Bureau, Woman's Home Companion, at the Woman's Committee session, New England Division, N.E.L.A. convention, September 13, 1927, in a talk entitled "The Dignity of Your Job," which was reprinted in the December 1927, issue of the N.E.L.A. BULLETIN, tells of an early experience as a society reporter for a midwestern city paper:

> "How bored I became with interviewing this hostess and that, writing long lists of names and silly decorations and dresses! In those days I did not even dream that I would reach millions through one magazine every thirty days. Today I do not see even the keys of the typewriter on which I write my monthly message to these millions. I see them—their homes, all over the United States—their activities—their interests—their needs—their ambitions."

We can do the same as Mrs. Richardson if we will but try. As a suggestion —go to your President, Vice-President, or others whom you serve—tell them you want to make your report more interesting to them. Explain to them that the accounts can be made to produce the answer to their questions. I am sure that we will be as agreeably surprised at the encouragement and help that lies within our grasp as others have been who have done this, if we will but seek it with an *open mind.*

Personality

Naturally, the approach to those associated with us will involve the word, "Personality," and while it is last in our

(*Continued on page* 620)

The Erection of Buildings and Other Structures by Electric Arc Welding

By B. S. HAVENS

General Electric Company

A YEAR or so ago the Supreme Court of Harrisburg, Pa., found it practically impossible to hold its sessions because of the annoying hammering of pneumatic riveters at work on a new office building adjoining the chamber. In order that the sessions might continue, it was necessary to issue a court order stopping the riveting while the court's term got under way.

Anyone who has ever attempted to carry on a telephone conversation, or to do any kind of business in an office near which riveting is going on, would very probably consider any method for the silent erection of buildings a blessing. And there is such a method. In July, 1928, Frank P. McKibben, nationally known structural engineer, listed a total of 85 structures erected by electric arc welding, including 43 buildings.* In one year these figures jumped 50 per cent: the total number of welded buildings increased to 65. The most notable development was in the increased height and size of the buildings involved.

Fortunately, the elimination of the noise nuisance is not the only advantage of the use of welding for this purpose. Early in 1927 the General Electric Company realized the advantages resulting from the use of welding, and accordingly decided to use welding instead of riveting in its future factory construction programs wherever it was practical to do so.

In order to design a welded building, however, it was necessary to design the principal or most important members. In factory buildings, for example, one of the most important members is the roof truss. A suitable design of welded roof truss was soon evolved and a 1,000-ton factory building was erected for the General Electric Company in Philadelphia shortly thereafter. This building used welded construction throughout, and all the roof trusses were welded by the American Bridge Company following the new design.

Had this building been riveted instead of welded, larger metallic sections would have been necessary, as rivet holes are responsible for certain losses. This loss, is equivalent to a strip of metal the full length and thickness of the part in which the hole is punched, and as wide as the diameter of the rivet.

Furthermore, in riveted structures, gusset plates are required to connect the various members together at their intersections. In the welded type of construction, members are directly connected to each other. General Electric experience has shown that these two items alone result in a saving of from 12 to 15 per cent in the amount of steel required.

So the welded building was theoretically feasible. And it was found to be thoroughly satisfactory in practice. Soon plans were made by this company for two more buildings which, although smaller, were also to be welded. One of these was erected at the Bridgeport, Conn., plant, and the other, at Pittsfield Mass. Their construction was marked by but one difference from that of the Philadelphia structure.

Some of the structural details of those buildings may be of interest. The Philadelphia building is approximately 140 ft. wide, 600 ft. long and 50 ft. high. Across one end and connecting to an adjoining building is a high-bay or transept spanned by seven of the new design welded roof trusses, each having a span of about 72 ft. The main wing of the building has a crane-bay over which are located 20 of the new trusses, each having a span of about 58 ft. There is also a gallery in an adjacent wing over which there are 20 welded trusses each of about 80 ft. span.

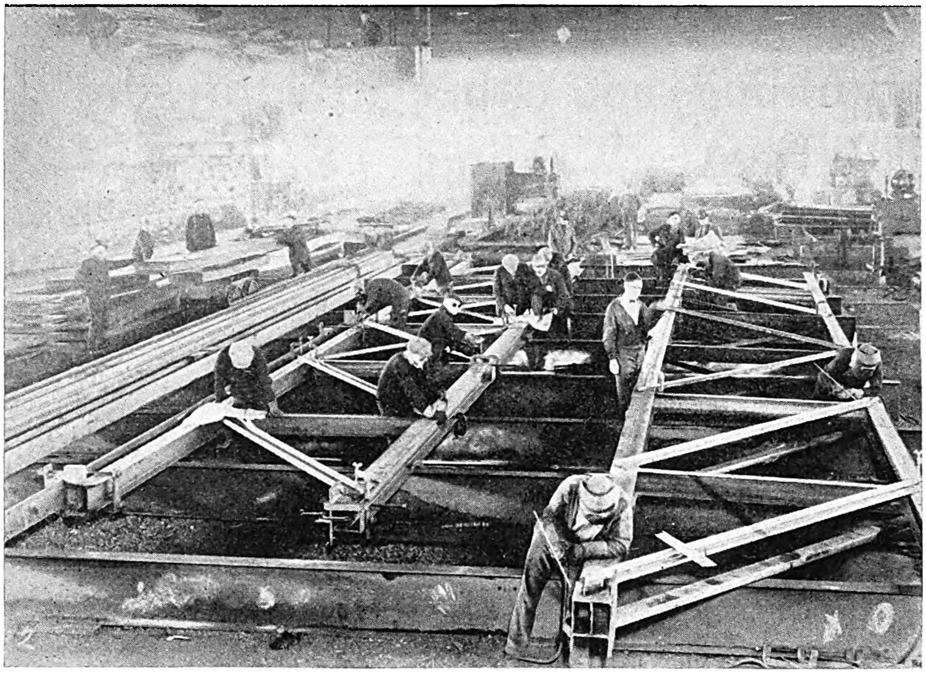
The new building at Bridgeport is a small, single-story structure, 64 ft. wide and 42 ft. long. It connects two existing buildings in which wire and cable are manufactured, thus making them into one. It required about 16 tons of steel. The Pittsfield building is a two-story structure of beam and column construction, about 40 ft. wide by 280 ft. long, and containing about 250 tons of steel. It is of steel frame, brick pilasters, base and cornice, and steel sash. Floors and roof are of concrete. It is used in the manufacture of molded products.

A further stimulus to the use of welding for building construction resulted from the design, during 1928, of a welded plate girder—an indispensible unit in many structural programs.** According to calculations, a saving of 16.2 per cent in the weight of the riveted girder can be effected by using electric arc welding. In the case of one welded

Welder at work on the welded factory building of the General Electric Company, Philadelphia, Penna.

General Electric Review, July, 1928.

**See *General Electric Review,* June, 1928; "A study in Welded Plate Girders," by Frank P. McKibben.



A roof truss being fabricated by welding in the Trenton shops of the American Bridge Company

girder, a swing of 27.1 per cent in steel weight resulted. It was pointed out, however, that this was not quite a fair comparison because the riveted girder has flange angles only, which extend the entire length, whereas in the welded girder weight is minimized by cutting off the flange plates to conform with the parabolic moment curve. On the other hand, it was shown that the riveted girder is a type in very common use and the comparison presented is justifiable.

Another and more equitable comparison showed that, when each of the two types had the outer flange plates cut to meet the moment requirements, a saving of 988 lb. or about 15 per cent was indicated for the welded girder as compared with the riveted form. A more precise comparison of weights would take cognizance of rivet heads and punchings from plates and angles on the one hand, with weights of welding electrodes consumed on the other.

One of the most interesting applications of welding to building construction during the past year was in the construction of an extension to the power house of the Haddon Hall and Chalfonte hotels of Atlantic City. This addition was erected, swiftly and noiselessly, without disturbing the guests of either hotel, or residents of the cottages in the neighborhood. The actual structural work was completed in a month's time, and the superstructure and finishing details were then added. The power house was scheduled for completion and use early this year.

The building is 134 ft. high and is one of the tallest welded steel frames in the world. Some of the steel columns supporting it and its contents are of the heaviest type of steel shapes used in building construction.

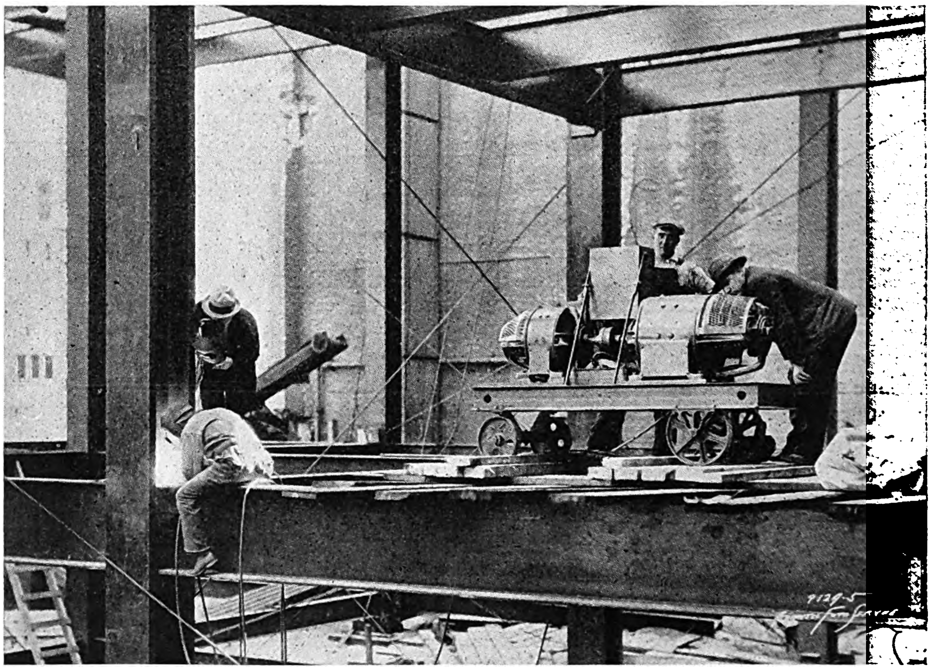
The hotels are owned by Leeds & Lippincott Company, the architects were Rankin & Kellogg of Philadelphia, the engineers were Carson & Carson of Philadelphia and the steel contractor was the Bethlehem Steel Company. Frank P. McKibben was retained as consulting engineer in connection with the design of the joints.

The erection was accomplished by the use of three arc welding sets, supplying three welding arcs used by three operators, with from 160 to 175 amp., direct current. Welding electrode having a diameter of 3/16 in. was used. In all cases a ⅜-in. filled weld was deposited at the joints, varying in length according to the application, stress, etc. It is estimated that, were the building riveted, it would have required the services of about three gangs of riveters, with three men in a gang.

The general dimensions are: 75 ft. by 89 ft., ground plan, and 134 ft. height above ground, including a pent house. The two hotels involved are situated one on each side of North Carolina Avenue, on the Boardwalk, in Atlantic City. The power house addition adjoins the Chalfonte but serves both. Pipe lines for heating and other purposes run underground across the street in a tunnel whose section is 7 ft. by 10 ft.

A total of six floors is involved, although the height is equivalent to that of a 12-story office building. In addition, there is a basement, and a pent house on the roof, the former housing piping and pumps, and the latter serving as a tank house. The engine room is located on the first floor; on the second floor are carpenter and machine shops, and ash handling equipment; the third floor is devoted to the boiler room; the fourth houses coal bunkers and ice machinery; the laundry is on the fifth floor, and bed rooms for employees are located on the sixth floor.

The framework is of beam, girder and column construction — the so-called skelton type. All floors are of reinforced concrete, and the walls are chiefly of brick. Steel sash was used throughout. In all, a total of 551 tons of steel is involved. Bethlehem H columns were used throughout, and the Bethle-



Welding operator at work on the welded power house hem types of girders and beams were utilized. One of the columns is the largest H-section rolled by the Bethlehem Steel Company, being a 16-inch H weighing 427 lb. per ft.

The work was so arranged that the welding not only did not hinder the progress of construction, but followed it along. In connecting to the existing power house (to which this will be an addition), a great amount of shoring and cutting away of brick and concrete were eliminated by reason of the welding.

Another very interesting application was in the fabrication and erection of an 11-story addition to "The Homestead," Hot Springs, Va. This structure, fabricated by the American Bridge Company under the direction of its Chief Engineer, James H. Edwards, was erected between the two large wings of the hotel. If riveting had been used, there is little doubt but that many of the guests in the hotel would have been so disturbed and annoyed by the noise that they would have left, with consequent financial loss to the management.

A number of other interesting applications have been made of the new tool welding, for structural work. A foot bridge, 846 ft. long, was constructed entirely by welding at the Schenectady plant of the General Electric Company. This structure contains 105 tons of steel, has 20 spans and involves a large number of supporting towers and "bents."

An ornamental structural gate, presented to Bowdoin College, at Brunswick, Me., by the class of 1903, was welded by the Bath Welding Company of Bath, Me. A total of 6,000 lb. of wrought iron was required, all parts being bent and shaped in the shops of the welding company.

Four pile drivers, made by the Mississippi Valley Structural Steel Company of Melrose Park, Ill., for the Walsh & Masterson Company of Chicago, were constructed recently by welding. As these machines are subject to very heavy duty, involving terrific vibration, night and day, strength was of particular importance. Now, after months of service, they are as rigid as when first built.

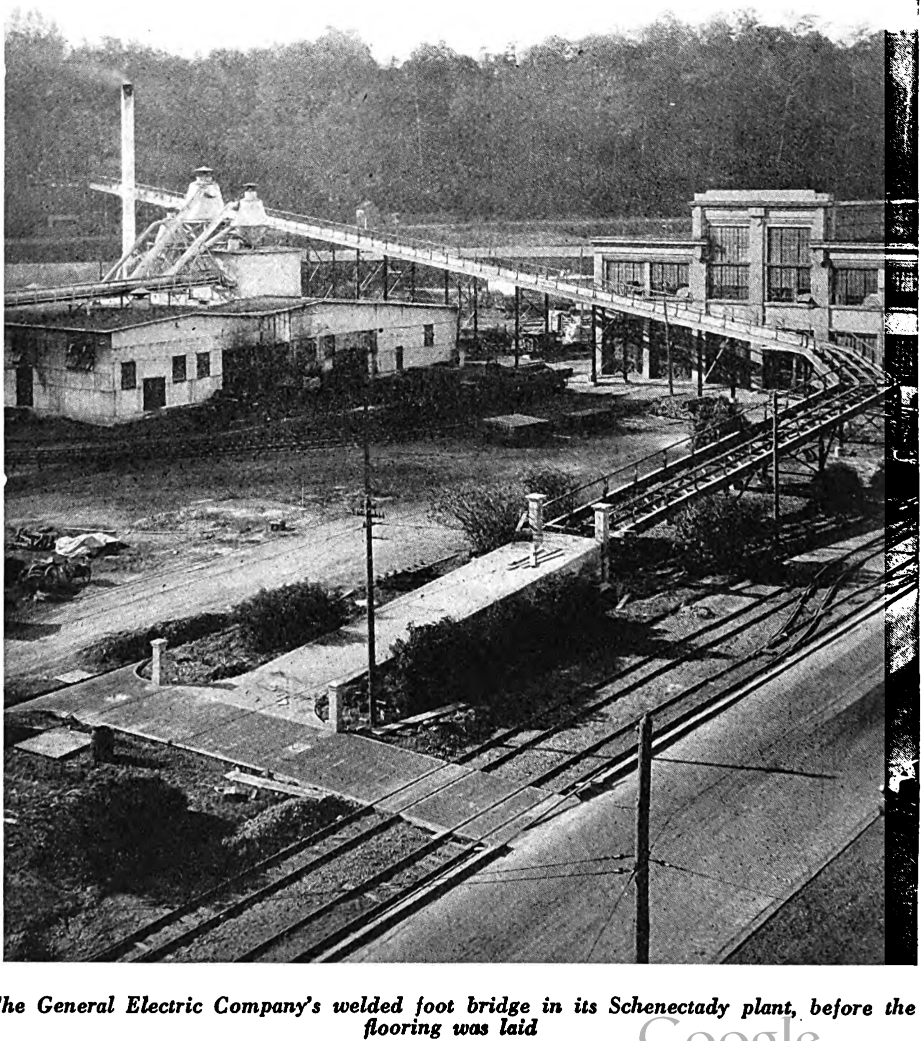
Each pile driver is 81 ft. high and operates a steam hammer weighing 10,300 lb. At no sacrifice of strength, a 15 per cent saving in material was effected in the construction of each. One of the principal advantages of the lighter weight thus secured was the greater ease with which the machines could be moved from place to place.

Finally, as an example of what welding plus a little ingenuity can do, there is a 40-car welded garage erected from second-hand material by the Dallas Power & Light Company of Texas for the protection of employees' automobiles. The total cost was but 25 per cent of the lowest contract price for an equivalent structure. A single portable welding set did the work.

The garage is made of steel angle-iron framework, covered with corrugated galvanized iron. There are two units, each 16 by 140 ft., divided into ten spans each 14 ft. wide, and each unit being capable of covering 20 cars. The units face each other with a 22-ft. driveway between.

The great saving in this instance was effected because the steel used was salvaged from the framework of an outdoor switching structure which became obsolete with the addition of generating equipment to the power plant. The varying lengths of the steel members removed, together with the numerous holes already punched for the switching structure (which would have interfered with the punching of new holes to fit the garage structure) would have made it necessary to splice or junk the greater part of the steel if a type of construction other than welding had been used. As the company possessed a portable welding set, it was decided to fabricate the structure by welding.

The roof trusses are of the simple Fink type. The upper and lower chords are made of two 2-in. by 2-in. angles welded together, back to back. The other members of the trusses are 1-in. by 1-in. angles. All members are connected together with ⅜-in. plate and the trusses themselves are connected to the columns in a similar manner. The span of each truss is 16 ft. and the height at the center is 3 ft. 2 in. The purlins for the roof are 2-in. angles, with one edge welded to the truss. This leaves a flat side of the angle for the corrugated iron roof to rest on. The columns are made of 5-in. angles. These columns are welded to the plate at each end of the truss. The back columns are braced to purlins and to trusses with short knee braces. The columns are spaced on 14-ft. centers. The girt angles to which the corrugated iron siding is fastened are welded on, the same as the purlins. The columns are bolted to the foundations through angle clips welded to the bases of the columns, and these are the only bolts in the entire structure. The roof and walls are made of 29 gage corrugated galvanized iron roofing fastened on with 6-in. roofing nails.



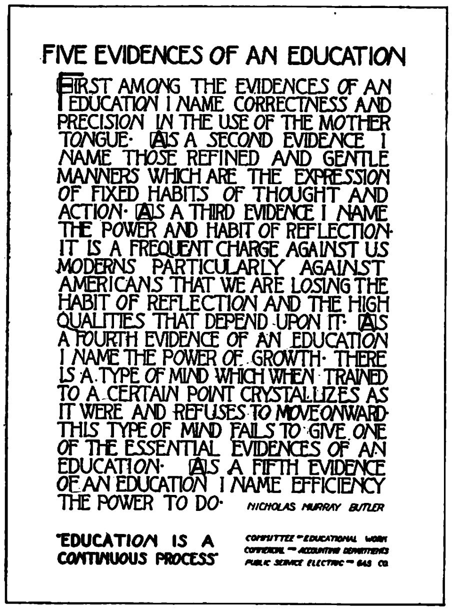
The General Electric Company's welded foot bridge in its Schenectady plant, before the flooring was laid

Home Study for Employees Encouraged by Power Companies

By JOHN J. MCIVER

WHILE many great industrial and commercial organizations of the country have acknowledged their active cooperation in the promotion of practical home study courses, which will prove mutually advantageous for the promotion of employees and the greater expansion of the organizations' business activities, no branch of industry can show greater progress in the promotion of this program than the electric light and power companies, along with their allied corporations, the traction and electrical companies, according to statistics provided by the National Home Study Council, Washington, D. C.

IN fact, a glance at the tabloid list. which follows, identifying but a few of the many organizations supporting or encouraging practical home study projects, offers mute acknowledgment and indorsement of the values of home study as a business and industrial asset. Culled from the roster of organizations supporting home study are: the Westinghouse Electric & Manufacturing Company, Pittsburgh; American Gas & Electric Company, New York; Alabama Power Company, Birmingham; Potomac Electric Power Company, Washington, D. C.; Northern States Power Company, Minneapolis; Tennessee Power Company, Chattanooga; Utah Power & Light Company, Salt Lake City; Empire Gas & Electric Company, Geneva, N. Y.; Commonwealth Electric Company, Summit, N. J.; Coast Counties Gas & Electric Companies, Santa Cruz, Cal.; Potomac Edison Company, Hagerstown, Md.; Texas Power & Light Company, Dallas; Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.; Washington Railway & Electric Company, Washington, D. C.; Capital Traction Company, Washington, D. C.; Kansas Gas & Electric Company, Wichita; Kentucky Traction & Terminal Company, Lexington; El Paso Electric Railway Company, El Paso; New York State Railways Company, etc.



FIVE EVIDENCES OF AN EDUCATION

FIRST AMONG THE EVIDENCES OF AN EDUCATION I NAME CORRECTNESS AND PRECISION IN THE USE OF THE MOTHER TONGUE· AS A SECOND EVIDENCE I NAME THOSE REFINED AND GENTLE MANNERS WHICH ARE THE EXPRESSION OF FIXED HABITS OF THOUGHT AND ACTION· AS A THIRD EVIDENCE I NAME THE POWER AND HABIT OF REFLECTION· IT IS A FREQUENT CHARGE AGAINST US MODERNS PARTICULARLY AGAINST AMERICANS THAT WE ARE LOSING THE HABIT OF REFLECTION AND THE HIGH QUALITIES THAT DEPEND UPON IT· AS A FOURTH EVIDENCE OF AN EDUCATION I NAME THE POWER OF GROWTH· THERE IS A TYPE OF MIND WHICH WHEN TRAINED TO A CERTAIN POINT CRYSTALLIZES AS IT WERE AND REFUSES TO MOVE ONWARD· THIS TYPE OF MIND FAILS TO GIVE ONE OF THE ESSENTIAL EVIDENCES OF AN EDUCATION· AS A FIFTH EVIDENCE OF AN EDUCATION I NAME EFFICIENCY THE POWER TO DO·

NICHOLAS MURRAY BUTLER

"EDUCATION IS A CONTINUOUS PROCESS"

COMMITTEE — EDUCATIONAL WORK
COMMERCIAL — ACCOUNTING DEPARTMENTS
PUBLIC SERVICE ELECTRIC — GAS CO

This is a reproduction of one of a series of posters prepared by the Committee on Educational Work of the Public Service Electric and Gas Co. of New Jersey

What is the motive inspiring these great organizations to support and encourage continuous home study among their employees? According to expressions from many executives, support and encouragement of home study projects for employees is considered a vital necessity in the expansion plans of the organizations. They point out that industrial and commercial organizations, like armies, can expand only as much as the available force of trained executives, specialists or officers will permit, in compliance with sound procedure.

A STATEMENT made recently by Howard Duryea, assistant to the general manager of the Alabama Power Company, visualizes in part the attitude now held by many great industrial and commercial organizations. He said:

"Many of the employees of the Alabama Power Company and Dixie Construction Company are taking correspondence or home study courses, and this effect is of considerable assistance to them, as well as being a marked and vital advantage to the company. These men are scattered over practically the entire northern half of Alabama, and the Birmingham office, therefore, is compelled to keep in touch with them by means of their superiors, rather than by direct contact.

"However, we find that our division managers, superintendents and foremen are all interested in the progress the field men are making in their home study pursuits. Hence, these officials follow the progress of each student closely, advising headquarters of the facts. Conscientious effort on the part of these men engaged in home study makes a good impression on any employee's superior and marks him for advance ahead of one who shows no desire to study. This is true even though both are equally capable in their routine work and display about the same degree of intelligence.

"THE Alabama Power Company also conducts its own vocational schools for the instruction of those directly employed at the plants and in the offices. Courses sponsored by an approved correspondence school are given in these company-owned schools. However, many of these employees, after completing their course of instruction in these classes then enroll with the correspondence school for higher courses.

"In compliance with the company's policy, I am not permitted to mention names in this case, but I can state that some of our best employees, now holding high and responsible positions with the Alabama Power Company, have been promoted solely on merit of their qualifications, which was made possible through their conscientious devotion to home study instruction."

Moreover, the attitude of the Alabama Power Company revealed by Mr. Duryea's statement is echoed by Charles M. Schwab, who summarized the outlook with these words:

"Two great problems confront the industrial and commercial circles of the nation. One is the necessity of reducing costs; the other is the importance of training and developing men."

In its encouragement and support of practical home study courses, as given by approved correspondence schools, the electric power and allied industries are following a trail blazed by great organizations in other fields of the country's industrial and commercial activities. Realizing that this is an age of specialists, these organizations are taking practical steps to create an adequate reserve force of trained employees and specialists, who may be ready for the opportunities that await them as expansion plans unfold.

The importance of an adequate reserve force of trained executives and specialists, which it believes is essential for the continuance of national prosperity, is set forth by the National Industrial Conference Board as follows:

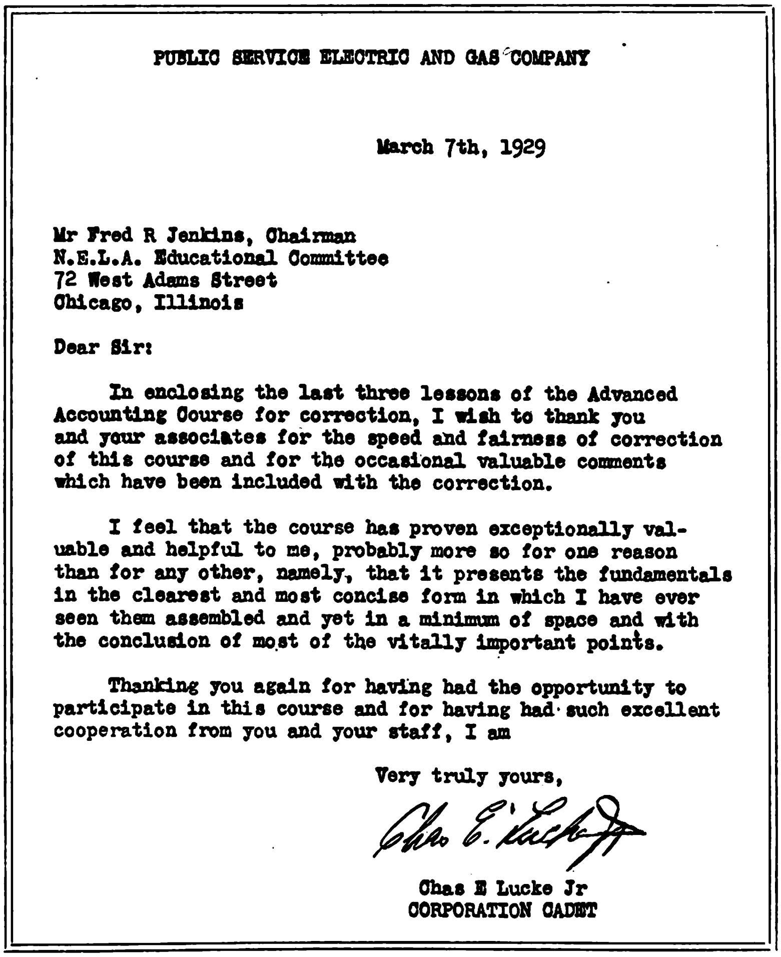
"IF the proportion of gainfully employed persons in the United States continues to increase at the same rate apparent since 1920, they will total 50,300,000 in 1930, and the administrators, supervisors and technical experts needed in American industry will number 1,900,000, an increase of approximately 400,000 over 1920. This is in addition to the replacements required during the ten-year period. Incidentally, of the 41,600,000 persons gainfully employed in the United States in 1920, less than 4 per cent planned activities and directed the energies of the whole working force.

"Hence, less competition and greater opportunity is offered in the specialized field of employment. This is due to the internal changes in industry, such as its magnitude and its multiplying complexity. Furthermore, in the past twenty-five years there has been a marked increase in the use of power and labor-saving devices and in the elaboration of methods of control in production and distribution. Each new division of labor thus creates another demand for those able to direct men and operations.

"Based on expert opinion expressed by acknowledged authorities in commercial and industrial circles, the normal progress of industrial methods and new competitive conditions will require a more rapid increase than ever before noted in the quality and number of trained executives and specialists."

THE STUDYING THAT REALLY COUNTS

In the words of Henry L. Doherty, "It's the studying you do after your school days that really counts. Otherwise you know only that which everyone else knows."



PUBLIC SERVICE ELECTRIC AND GAS COMPANY

March 7th, 1929

Mr Fred R Jenkins, Chairman
N.E.L.A. Educational Committee
72 West Adams Street
Chicago, Illinois

Dear Sir:

In enclosing the last three lessons of the Advanced Accounting Course for correction, I wish to thank you and your associates for the speed and fairness of correction of this course and for the occasional valuable comments which have been included with the correction.

I feel that the course has proven exceptionally valuable and helpful to me, probably more so for one reason than for any other, namely, that it presents the fundamentals in the clearest and most concise form in which I have ever seen them assembled and yet in a minimum of space and with the conclusion of most of the vitally important points.

Thanking you again for having had the opportunity to participate in this course and for having had such excellent cooperation from you and your staff, I am

Very truly yours,

Chas E. Lucke Jr

Chas E Lucke Jr
CORPORATION CADET

THE NATIONAL ELECTRIC LIGHT ASSOCIATION offers at a nominal price a number of educational courses available to all utility company employes. These courses, with their costs, are as follows:

Elementary Course in Bookkeeping and Accounting

This course is designed to give the student a proper understanding of the fundamentals on which is based the accounting theory and practice of all business. The cost is $16.00.

Advanced Course in Electrical Utility Accounting

This course was established in response to a very evident demand for standard instruction in accounting for the electrical industry. To get the best results from it, the student should have a thorough fundamental training in bookkeeping; and those desiring to take this course should give satisfactory evidence of having received instruction equivalent to the elementary course offered by the association. The cost is $85.00.

Course in Practical Electricity

This course has been specially prepared for central station men not having a technical education. It is written in plain English, without higher mathematics and without unnecessary technical expressions. It takes up in ten lessons the theory of electricity, beginning with magnetism, and continuing on through a discussion of D. C. circuits, generators and motors, to the fundamental principles of A. C. generation, transformation, distribution, and utilization. The cost is $12.00.

Commercial Courses

The three commercial courses: **Lighting Sales, Merchandise Sales, Power Sales,** are divided into two parts—the first part of five lessons being common to all three. This part discusses salesmanship, public relations, elements of electricity, principles of rates, and wiring for light and power. The second part varies, so that the salesman in any of the three branches may take only that course applicable to the specialized knowledge demanded in his work.

The **Lighting Sales Course** takes up principles of illumination, and residence, commercial, industrial and outdoor lighting, in seven lessons.

The **Merchandise Sales Course** discusses advertising, merchandising, heating and household appliances, industrial applications and selling campaigns, in five lessons.

The **Power Sales Course** studies motors and their applications, steam, oil and gas engines, isolated power plants and industrial heating. The cost of the four Commercial Courses is $12.00 each.

Course for Electrical Metermen

The Course for Electrical Metermen is divided into three parts: Elementary theory, direct current meters and single-phase alternating current meters. The student may combine part two or part three with part one for $12.00, or take all three parts for $18.00.

Further information regarding these courses may be secured by writing to

FRED R. JENKINS, *Chairman,* N. E. L. A. Educational Committee, 72 West Adams St., Chicago, Ill.

National Food Preservation Program Begins

Local Activities Will Thoroughly Cover Country During Month of September

ACTIVITY in the National Food Preservation Program opened on a nation-wide scale September 1, and the rapidity with which organizational work has gone forward at the time this article is written promises that local activities will thoroughly cover the country during Food Preservation Month.

The local councils which have completely organized, or which have shown their intention of actively cooperating with the National Program by requisitioning tie-up materials prior to August 1, are situated in all parts of the country, and practically every one of the forty-eight States. The location of these cities is shown on the map printed below.

Several hundred more will be in action than are indicated on the map. Most of the larger cities are in this classification, since their greater size made it imperative that the local Councils take more time in the organizing steps and in preliminary planning to assure the maximum of correlation of all the organizations intending to participate. The New York Council has just completed its organization plans. Extensive publicity includes a $100,000 appropriation for billboard and newspaper advertising in addition to other spectacular features.

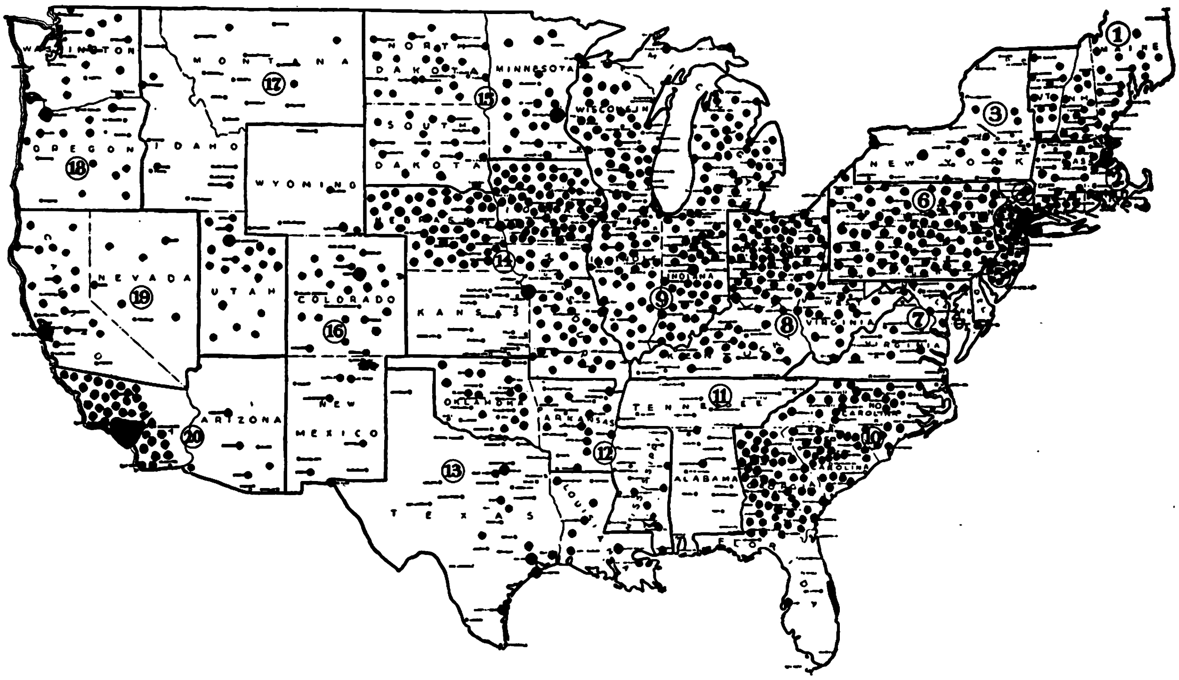
An indication of the vigor with which participation has been planned, is presented by the amount of the various tie-up materials ordered from National Advertising Headquarters. Nearly 5,000,000 milk bottle jackets, 40,000 truck banners, 6,000,000 booklets for the information of competitors in the National Idea Contest for $25,000.00 in prizes, 600,000 thermometers, and proportionately large amounts of other materials had been requisitioned up to the last week in July.

With such intensive programs for local activity linked with the National Program, and its dominant space in the national magazines, an impressive effect on the consciousness of the public in regard to the necessity of proper modern refrigeration should result. The magazine advertising is already under way, and entries in the National Idea Contest are pouring into Headquarters. Other activities in this nation-wide movement are going ahead at an equally rapid pace.

Local success of the movement, however, is dependent largely upon local cooperation by all the agencies concerned, particularly the interest and leadership of the power company in stimulating action among those engaged in any business concerned with the preservation of the public health, and the nation's food supply.

An example of the cooperation being obtained from the leaders in the national movement is given in the announcement by three of the members of the Publicity Committee, representing the General Electric Company, Kelvinator Corporation and Frigidaire Corporation, that their firms, which are national radio advertisers, will devote at least part of their time on the air during September, to broadcasting National Food Preservation Program propaganda.

Endorsement of the Program by the California Fruit Growers Exchange, recently received in a letter at National Headquarters, opens up a new channel for the active promotion of the program's work. The Exchange advised Headquarters that it would aid the work of the Program in every practicable way, and that it would tell all distributors of the famous "Sunkist" products of its action, and call upon



STATUS OF ORGANIZATION WORK ON THE NATIONAL FOOD PRESERVATION PROGRAM AS OF AUGUST 1st

Dots show the cities in which active work has been initiated, councils completely organized, or tie-up materials requisitioned, as reported to National Headquarters at that time. Indications point to local participation in the Program by organizations in more than a thousand cities and towns.

them to cooperate in furthering local programs in their communities.

Their letter says:

"Your letter to Mr. C. C. Teague, President of this organization, has been referred to this department. We were interested in going over the plans for National Food Preservation Month and the explanation of your program. We are pleased to endorse and to commend it as an excellent piece of educational work.

"We feel that in the educational type of advertising used by this organization, we are contributing something to the cause of better health. We are, therefore, glad to be associated with the other national organizations participating in your program and to lend our endorsement to this new educational job."

With support of this character coming from not only this organization, but also from the Federation of Women's Clubs, Bureau of Home Economics, Department of Agriculture, National Retail Furniture Association, American Gas Association and numerous electric groups, together with the National Electric Light Association, it is confidently expected that National Food Preservation Month, just now being ushered in, will prove one of the most successful undertakings in public education in the history of modern society.

Government Bodies Report That Danger in Mechanical Refrigeration Is Negligible

AFTER a detailed study of mechanical refrigeration, three government bodies have issued a joint statement, declaring that serious accidents from such devices are infrequent and that no further investigation was necessary. The conference was called by Dr. Hugh S. Cummings, Surgeon-General of the Public Health Service, and was attended by representatives of that agency, the Bureau of Standards and the Bureau of Mines. In the formal statement, issued to prevent "undue anxiety," the agencies agreed that the Bureau of Mines, which has been conducting investigations, should continue its work.

The full text of the statement follows:

"Several deaths which have occurred recently in Chicago have been attributed to poisoning by methyl chloride which leaked from refrigerating systems. These have received wide publicity, and have caused apprehension, even among the users of refrigerating equipment entirely unlike that to which the fatalities have been attributed. It is the purpose of this statement, authorized jointly by the Public Health Service, the Bureau of Standards, and the Bureau of Mines, to state the essential facts regarding this danger and to relieve any undue anxiety in the minds of those possessing household refrigerating systems.

"All refrigerating systems in practical use depend for their operation upon the repeated gasification and condensation (sometimes by dissolving or 'absorbing' in another substance) of a material which is technically called a 'refrigerant.' In most cases the refrigerant is confined under pressure in the refrigerating machine and, if it escapes from the system, becomes a gas which mixes with the surrounding air.

"For many years the gas ammonia was almost the only refrigerant used. For technical reasons other refrigerants have more recently been introduced and are now extensively employed. Sulphur dioxide and methyl chloride are the most important of these.

"None of the three refrigerants mentioned —ammonia, sulphur dioxide or methyl chloride—can be breathed with impunity, but none are violent poisons when breathed for a short time in low concentrations. If the same amount of the three substances is considered, methyl chloride is the least poisonous of the three; but because their physiological effects are quite different it is hard to make a quantitative comparison.

"Sulphur dioxide and ammonia both have strong odors which are easily recognized and are so irritating that no one is likely to breathe much of them if escape is possible. Methyl chloride has a slight and rather pleasant odor, which probably would not awaken a sleeping person and might not be recognized by one who was awake. To this fact is to be attributed any greater hazard from methyl chloride than from other commonly used refrigerants.

"Most of the trouble attributed to methyl chloride has occurred in connection with multiple refrigerating systems installed in apartment houses in which a single compressor delivers the refrigerant through tubes to the refrigerators in the several apartments. A large majority of the individual household refrigerators of the motor-driven (electric) type now in use employ sulphur dioxide as the refrigerant. Nearly all, if not all, of the domestic refrigerators, the operation of which depends upon supplying heat instead of mechanical compression, use ammonia. This class includes a few electric refrigerators of unusual type and all of the gas-fired refrigerators. The escape of the refrigerant from the more commonly used household refrigerating systems would, therefore, be at once made evident by its odor.

"Newspaper headlines and statements to the effect that the fatalities in Chicago were caused by 'gas refrigeration' without doubt had reference only to the fact that refrigerants are gases. 'Illuminating' or fuel gas was in no way involved.

"The high volatility of all practical refrigerants makes it quite improbable that enough of these substances could be retained in food stored in the refrigerator to be harmful.

"Methods for eliminating the danger from methyl chloride systems are being studied. It would be premature to say whether the end will be accomplished by replacing methyl chloride entirely by other refrigerants, by adding something which will give the refrigerant a sufficiently powerful odor, or by so improving the mechanical construction of the equipment that leakage will not occur where the gas might enter rooms in which people live.

"It should be recognized that the number of serious accidents from household refrigerating systems has been small in comparison with the number of such systems in use, and improvements may be expected which will much reduce the small hazard that does exist."

Obituary

Armistead K. Baylor

ARMISTEAD K. BAYLOR, aged 61, General Electric commercial engineer and veteran of the electrical industry, died suddenly early on the morning of Aug. 1 at Ipswich, Mass., where he was summering. In 1891 Mr. Baylor went with the Thomson-Houston Electric Company at West Lynn, Mass., and moved to Schenectady, N. Y., in 1894 when the headquarters and main offices of the General Electric Company were established there. In 1896 he went abroad to become manager of the traction department of the British Thomson-Houston Company, becoming general sales manager there. After fourteen years he returned to this country to re-enter the General Electric organization, and for several years was in the commercial general department. Mr. Baylor was also vice-president, director and a member of the executive committee of the Edison Electric Appliance Company. In addition he served on the directorate of the Electric Vacuum Cleaner Company and the Contract Purchase Corporation.

Mr. Baylor was very active in Association work. He was also a member of the American Institute of Electrical Engineers and of the Institution of Electrical Engineers (Great Britain).

James T. Hutchings

JAMES T. HUTCHINGS, vice-president of The United Gas Improvement Company in charge of engineering development, died suddenly on Saturday, Aug. 17, at Ocean City, N. J. Heart disease was the cause.

Mr. Hutchings entered the employ of the U. G. I. Company in 1920 as assistant general manager. In August, 1921, he became general manager, and two years later was elected vice-president in charge of operations. In February, 1927, he became vice-president in charge of engineering development.

Born in Amherst, Mass., in 1869, a son of John F. and Clara (Dana) Hutchings, he attended Amherst public schools and was graduated from Massachusetts Agricultural College with the degree of Bachelor of Science in 1889. His first position after graduating was with the Thomson-Houston Electric Company, of Amherst, in which he remained about four months. In that same year he came to Philadelphia to accept a position as foreman of wiring with the Germantown Electric Company, and later became superintendent of the West End Electric Company, in which position he remained until that company and numerous other small companies in the city were consolidated into the Philadelphia Electric Company. From 1897 to 1904 he was employed by the latter company as assistant electrical engineer.

Then followed sixteen years with the Rochester Gas and Electric Corporation during which he held the positions of superintendent of the Electric Department, assistant manager, general manager and president. He capably filled the latter position for two years, until 1920, when he entered U. G. I. employ.

During the World War, Mr. Hutchings was chairman of the Manufacturers' Committee of the Rochester District, in charge of production, and was power expert for the Ordnance Department in charge of munitions production.

Mr. Hutchings was a member of the National Electric Light Association, American Gas Association, American Institute of Electrical Engineers, Engineers Clubs of Philadelphia and New York, the University Club of Philadelphia, and the Overbrook Golf Club.

Charles H. Ingalls

CHARLES H. INGALLS, for many years meter engineer of the Edison Electric Illuminating Company of Boston, Mass., and one of the most eminent specialists in this field in the utility industry, died suddenly on Aug. 4 at Rockport, Mass. Mr. Ingalls was born at Danvers, Mass., 56 years ago, was educated at the Massachusetts Institute of Technology and entered the employ of the Edison company in 1896, the year of his graduation. He was active for many years in the work of the N.E.L.A., and had held many responsible committee posts in connection with electrical measurement engineering. Under his direction were installed the extensive facilities for multiple testing of meters by automatic methods at the general service buildings of the Edison company which have attracted the admiration of meter specialists from all over the world.

Honor to the Faithful Employee

By B. C. FORBES

MANY people and many things have contributed to make America great. Nobody has contributed more than America's capable workers.

We delight to honor all kinds of people; but how often is adequate honor done to workmen deserving honor?

This neglect makes all the more interesting and worthy of note the signal tribute paid one faithful workman by one large corporation.

George B. Cortelyou, president of the Consolidated Gas Company of New York, has just had prepared a unique little volume, with the simple title, "John O'Connell." It is devoted entirely to a sketch of John O'Connell's career and a reproduction of a commemorative tablet which reads:

"In recognition of the unprecedented continuous service of seventy-two years at this plant of John O'Connell, General Foreman, who died on July 13, 1928, the Twenty-first street plant of the Consolidated Gas Company was by order of the executive committee on Tuesday, March 5, 1929, designated as the O'CONNELL PLANT."

How many workers not above the rank of foreman have had a big plant named after them?

In unveiling this tablet, President Cortelyou said:

"In affixing this commemorative tablet to the walls of the Twenty-first street plant—now known as the O'Connell plant—we are but giving effect to what was already as established fact; for whether so officially designated or not, this plant would always be associated with the name of John O'Connell. We cannot think of one without the other. His long life was spent here. Beginning as a lad of seventeen, he worked here for nearly three-quarters of a century, doing his duty well and faithfully all the time, and making a record of continuous active service that is unprecedented. All of his interests were centered in this neighborhood. Near here is the church in which he worshipped, and it is in this section that he spent so many of his spare hours in visiting and helping the poor, the sick and the needy. In his life, both inside and outside the plant, he exemplified those virtues which ennoble the individual and exalt the nation.

"Though he is gone from us, his character and example remain as an inspiration to those who follow after. We are proud to belong to an industry that produces such men as John O'Connell."

It may be complained that John had to wait until he was dead before his services were recognized. He didn't. Three years ago his company tendered him an anniversary dinner, "on the occasion of his completion of three-score-and-ten years of continuous employment." That function was graced by the attendance of many notables in the Consolidated Gas Company, from President Cortelyou down, as well as by a number of prominent citizens in various walks of life, some of them familiar with John O'Connell's daily benefactions conducted over a period of more than half a century.

These bits from the life history of John O'Connell reveal that a man does not have to possess riches to become a genuine philanthropist and that even the longest of working hours need not prevent one from finding the time to do good if his heart beats warmly:

"For many years he lived in a house owned by the company and located at the works, where he was on call at all hours of the day and night. Aside from his home, family and church ties, his life was centered in the works, and to do it he gave unreservedly the best that was in him.

"He never took a vacation or a Sunday off, and up to the time of his final illness he scarcely knew what it was to be sick. He seldom went out of the neighborhood, and then only for a few hours at a time.

"At a meeting of the directors on April 20, 1880, the president was directed to present to John O'Connell the sum of $50, as a token of their appreciation of his services on the occasion of the fire in the Scrubber House.

"For more than seventy years he never missed 6 o'clock Sunday morning mass. He held various offices in the St. Vincent de Paul Society, and was active in charitable work, spending most of the hours between supper and bedtime in visiting and relieving the sick and needy of the parish. He was a generous contributor to all the objects of the church and was a donor of several memorials. Practically every moment of his waking hours was filled with useful work.

"Thus, within the sphere which he marked out for himself, John O'Connell achieved a success and a distinction that will be remembered and cherished as long as the industry that he loved so well and served so faithfully endures."

May the telling of this story inspire other employers to pause and consider whether they have not in their employ some man or men justly entitled to more than ordinary recognition.

(Copyright, 1929, by B. C. Forbes)

Papers Submitted in Prize Awards Contest Now Available to Members

THE BULLETIN publishes below and on the next page a partial list of papers entered in the 1928-1929 competition for the various prize awards offered annually under the auspices of the Association. Other papers were listed in the August issue of the BULLETIN.

The Association will be glad to loan any of the papers listed upon application to the Secretary, National Electric Light Association, 420 Lexington Avenue, New York, N. Y. Requests for loans of the papers will be filled in the order of receipt.

PAPERS WHICH WILL BE LOANED TO MEMBERS

Submitted by	*Employed by*	*Title of Paper*
Macy, Wilbur A.	San Joaquin Light & Power Corp., Los Banos, Cal.	"Public Relations in the Electric Light and Power Industry."
Maerz, Alexander	Androscoggin Electric Co., Lewiston, Me.	"Philosophy of Public Relations."
Mahaffey, Florence C.	New York State Elec. Corp., Plattsburg, N. Y.	"From the Home Service Point of View."
Marsh, Henry L.	Iowa Public Service Co., Sioux City, Ia.	"Merchandising for Kilowatt Hour Revenue."
McGillen, Leo P.	Lawrence Gas & Elec. Co., Lawrence, Mass.	"Electricity and Public Utilities."
Meyer, William N.	Florida Power & Light Co., Miami, Fla.	"Public Relations in the Electric Light and Power Industry."
Millikin, K. C.	Dominion Power & Trans. Co., Ltd., Hamilton, Ont.	"Public Utility Merchandising."
Moon, V. H.	Pacific Power & Light Co., Portland, Ore.	"That Million."
Moore, S. E.	Chester Valley Electric Co., Coatesville, Pa.	"Feeling the Public's Pulse."
Morgan, A. W.	The Toledo Edison Co., Toledo, Ohio	"Public Utility Taxation."
Mosse, Alvin H.	Texas Power & Ltg. Co., Dallas, Tex.	"Public Relations."
Moyer, Herbert C.	Pennsylvania Power & Light Co., Hazleton, Pa.	"The Grounded Neutral System in Organization."
Murphy, Charles J.	Commonwealth Edison Co., Chicago, Ill.	"Public Relations."
Murphy, Daniel	New Orleans Public Service Co., New Orleans, La.	"Bill Clerk, Esq."
Muse, George A.	Malden Electric Co., Malden, Mass.	"Public Relations."
Myer, Clinton D.	Public Service Elec. & Gas Co., Newark, N. J.	"Public Relations and Personnel."
Neeley, Frederick E.	El Paso Electric Co., El Paso, Tex.	"Neon Gas Signs."
Nelson, H. A.	N. Y. & Q. Elec. Lt. & Pr. Co., Jamaica, N. Y.	"The Company's Service to the Community."
Nelson, Marie W.	Mississippi Power Co., Gulfport, Miss.	"The Second Mile."
Newberry, R. R.	The United Power & Light Corp., Hutchinson, Kan.	"Public Relations Through the Accounting Department."
Nonneman, H. S.	The Dayton Power & Light Co., Dayton, Ohio	"Central Station Selling of Electrical Advertising."
O'Connell, E. T.	Alabama Power Co., Birmingham, Ala.	"A Primer on Public Relations."
Oelheim, Herbert J.	Buffalo General Electric Co., Buffalo, N. Y.	"Public Relations in the Electric Light and Power Industry."
Palmer, Louis L.	Cambridge Elec. Lt. Co., Cambridge, Mass.	"Applied Common Sense."
Parker, A. E.	Winnipeg Electric Co., Winnipeg, Can.	"Public Relations Director—Ambassador Extraordinary."
Paschal, Ridge	The Great Western Pr. Co., Sacramento, Cal.	"Public Relations from the Power Salesman's Viewpoint."
Pearson, E. F.	Northwestern Electric Co., Portland, Ore.	"Merchandising Versus Panalizing."
Pech, R. John	Wisconsin Public Service Corp., Green Bay, Wis.	"Thinking of Public Relations."
Perkins, Guy S., and George J. Jansen	Buffalo General Elec. Co., Buffalo, N. Y.	"Promotion of Better Public Relations in the Electric Light and Power Industry."
Perkins, Phil. B.	Northwestern Elec Co., Portland, Ore.	"Employees as a Factor in Public Relations."
Pfeiffer, Edw. V.	Elmira Water, Light & Railroad Co., Elmira, N. Y.	"Public Utility Selling."
Pinney, J. Preston	Southern California Edison Co., Los Angeles, Cal.	"The Fundamentals of Good Public Relations."
Poutie, Miss Beryl I.	Buffalo General Elec. Co., Buffalo, N. Y.	"Electric Development as an Aid to Agriculture."
Probst, O. E.	Northern States Power Co., St. Paul, Minn.	"Public Relations."
Prudent, Arthur J.	Western New York Gas & Elec. Corp., Lancaster, N. Y.	"Public Relations."
Purton, T. A.	Idaho Power Co., Boise, Idaho	"Organizing Engineering for Rural Electrification."
Radcliffe, J. H.	Idaho Power Co., Twin Falls, Idaho	"How to Increase the Usefulness of the Accountant in the Public Utility Industry."
Rakemann, Fred B.	J. G. White Management Corp., New York, N. Y.	"Industrial Development and Public Relations."
Rall, Albert A.	Kansas City Power & Light Co., Independence, Mo.	"The Need for Executive Support in Accident Prevention."

Submitted by	*Employed by*	*Title of Paper*
Rapelje, J. F.	Canadian Niagara Power Co., Fort Erie, Ont.	"Public Relations."
Reiman, Louis L.	Buffalo General Elec. Co., Buffalo, N. Y.	"Increasing the Lighting Load by Personal Solicitation."
Reiter, Fred M.	Dayton Power & Light Co., Dayton, Ohio	"What Constitutes Public Relations."
Riker, B. M.	Rockland Light & Power Co., Nyack, N. Y.	"This Matter of Public Relations."
Roberts, J. D.	Central Illinois Public Service Co., Springfield, Ill.	"Suggested Construction Standards for Rural Lines."
Rodgers, Dorothy C.	Utica Gas & Elec. Co., Utica, N. Y.	"Good Will in Public Relations."
Romoguera, L. H.	New Orleans Public Service Co., New Orleans, La.	"Cost Accounting Problems of a Public Utility."
Ross, Mrs. Dosenia	United Power & Light Corp., Manhattan, Kan.	"Rural Electrification."
Russell, Emma Massonneau	Connecticut Light & Power Co., Greenwich, Conn.	"Public Relations."
Schaumberger, Joseph	Union Elec. Lt. & Pr. Co., St. Louis, Mo.	"Diverting Electricity."
Scott, Robert S.	Stone & Webster, Inc., Tullahoma, Tenn.	"The Watt-Hour Meter."
Scott, Robert S.	Stone & Webster, Inc., Tullahoma, Tenn.	"Advertising."
Seaman, G. A.	Colorado Central Power Co., Golden, Colo.	"Public Relations in the Electric Light and Power Industry."
Sharp, Rose L.	Arkansas Power & Light Co., Pine Bluff, Ark.	"Public Relations."
Shea, Miss Odette	New Orleans Public Service, Inc., New Orleans, La.	"The Value of Company Educational Work to Women Employees."
Shorts, J. E.	The Niagara Falls Pr. Co., Niagara Falls, N. Y.	"Economy of Electricity in the Home."
Stabler, E. E.	Illinois Northern Utilities Co., Sterling, Ill.	"The Reconnaissance and the Preliminary and Location Survey for a Hydro-Electric Plant."
Stapleton, T. E.	Bradford Electric Co., Bradford, Pa.	"Successful Merchandising."
Steinhauer, W. H.	The Toledo Edison Co., Toledo, Ohio	"Electric Water Heating."
Steinhauer, W. H.	The Toledo Edison Co., Toledo, Ohio	"For Sale: Sunlight."
Stelzer, James G.	Stevens & Wood, Inc., Jackson, Mich.	"The Future of the Electric Power Industry."
Stelzer, James G.	Stevens & Wood, Inc., Jackson, Mich.	"Application of the Standardization Idea to the Public Utility."
Stephens, Wilfred C.	Buffalo, Niagara & Eastern Pr. Corp., Kenmore, N. Y.	"The Good-Will of the Consumer."
Sturgell, Verna J.	Galveston Electric Co., Galveston, Tex.	"Utility Doggerel."
Sundholm, C. E.	Niagara, Lockport & Ontario Pr. Co., Jamestown, N. Y.	"Public Relations in the Electric Light and Power Industry."
Sundholm, C. E.	Niagara, Lockport & Ontario Pr. Co., Jamestown, N. Y.	"How to Increase the Usefulness of the Accountant in the Public Utility Industry."
Sweet, Everett L.	Central Hudson Gas & Elec. Corp., Poughkeepsie, N. Y.	"The Trend of Budgeting Among Electric Utilities."
Van der Berg, J. A.	Interstate Power Co., Albert Lea, Minn.	"Facts and the Public."
VanGenderen, Miss Lena	Indiana & Michigan Elec. Co., Three Oaks, Mich.	"The Cashier—the Company's Good-Will Representative."
Vetter, C. P.	Great Western Power Co., San Francisco, Cal.	"Volume Changes in Concrete Due to Moisture Content."
Vietzen, Elmer R.	Commonwealth Edison Co., Chicago, Ill.	"Prevention of Failures in Underground Distribution Systems."
Wagner, Carl A.	Wagner's Electric Shop., Denver, Colo.	"Means of Building Up a Demand for Electric Current, Particularly in Those Hours that Now Show a Relatively Small Proportion of the Peak Load."
Wahl, Frank S.	Tonawanda Power Co., N. Tonawanda, N. Y.	"If I Were a Foreman."
Walker, Mrs. R. S.	Tucson Gas, Elec. Lt. & Pr. Co., Tucson, Ariz.	"The Three Most Important Factors in Public Relations."
Walker, Mrs. R. S.	Tucson Gas, Elec. Lt. & Pr. Co., Tucson, Ariz.	"The Red Seal Plan of Certified Wiring."
Warburton, Winthrop E.	Brooklyn Edison Co., Brooklyn, N. Y.	"Getting New Business."
Watson, Percy H.	Edison Elec. Illuminating Co., Brockton, Mass.	"Public Relations."
Watts, Raymond A.	San Diego Consolidated Gas & Elec. Co., San Diego, Cal.	"New Tools for the Accountant."
White, Byron E.	Utica Gas & Elec Co., Utica, N. Y.	"An Asset Often Wasted—and an Opportunity."
Whitright, G. M.	Henry L. Doherty & Co., 60 Wall St., New York, N. Y.	"The Power and Light Industry Needs Economic Research."
Wilson, Edward F.	Associated Gas & Elec. Co., New York, N. Y.	"A Rational Basis for Operating Standards."
Witt, Elda	West Texas Utilities Co., Paducah, Tex.	"Public Relations."
Witt, R. D.	Keokuk Electric Co., Keokuk, Ia.	"Relationships of Producer and Consumer in the Light and Power Industry."
Woll, Willard M.	Commonwealth Edison Co., Chicago, Ill.	"Power Factor—Its Relation to the Electrical Industry."
Wood, Albert H.	Public Service Elec. & Gas Co., Newark, N. J.	"Public Relations Work—the Dynamo and Circuit Breaker."
Wren, John Gilbert	Commonwealth Edison Co., Chicago, Ill.	"Public Relations in the Light and Power Industry."
Wren, John Gilbert	Commonwealth Edison Co., Chicago, Ill.	"Public Ownership versus Private Ownership."
Yaeger, G. W.	Driver Harris Co., Newark, N. J.	"Improvements Made by Electric Light and Power Industry."
Yeager, Edith	Westchester Lighting Co., Mt. Vernon, N. Y.	"Better Public Relations Via Better Home Lighting."

Service Suggestions
NATIONAL ELECTRIC LIGHT ASSOCIATION — COMMERCIAL NATIONAL SECTION
CUSTOMER RELATIONS COMMITTEE
H. T. EAST, *Chairman*, Public Service Co. of Northern Illinois, Chicago, Ill.
To formulate efficient methods of conducting relations between the customer, the public and the supply company, including such matters as taking applications in the office, forms, order routing, inquiries, complaints, meter reading, collections and credits

No. 75 **September, 1929**

Active Meters in Vacant Premises

By R. F. BONSALL

Consolidated Gas, Electric Light and Power Company of Baltimore, Baltimore, Maryland

A SUGGESTION that meters be left alive and active when residential premises are vacated was the subject of a Service Suggestion published in January, 1926. Data were presented to show that the plan possessed advantages for the company as well as the customer. This idea was later placed in effect by several operating companies with gratifying results. Despite this success in changing company policies for the convenience of the user, many companies continue to follow the old policies and it is deemed desirable to present further information concerning the plan and the results to be obtained by its adoption.

The practice of leaving meters in place and connected when a customer moved was started in 1913 by one of the larger eastern companies. Based upon experience extending over a period of more than fifteen years the plan proved to be a decided factor in building public good-will. It also effected a considerable annual saving in operating expenses by the elimination of considerable costly physical effort expended in setting and removing meters.

A recent canvass was made of a group of representative companies to learn their present practice in the matter. A tabulation of their replies shows that the majority of the companies have adopted the plan of leaving the meter connected and ready for use by the incoming tenant. Eight companies reported that the meters were disconnected in some manner but not removed. Thus practically all of them have adopted the general practice of leaving the inactive meter on the premises, either as alive and ready for use or with the fuses removed and sealed but ready to be placed in service on short notice.

Several of the companies which report that their meters are disconnected, state that they leave them connected during moving seasons in order to facilitate the completion of service orders during these rush periods. This serves to emphasize the value of the plan and leads to the prediction that eventually these companies will make it their general practice to leave all inactive meters connected ready for immediate use when a new customer moves in.

The reports further indicate that the experience of companies which have adopted the plan has been very satisfactory. Several of them have stressed the improvement in better public relations that naturally results when the many thousands of customers who move into new homes each year find the electric service ready at the push of the nearest switch.

86054
SAFETY SWITCH ON
OFF

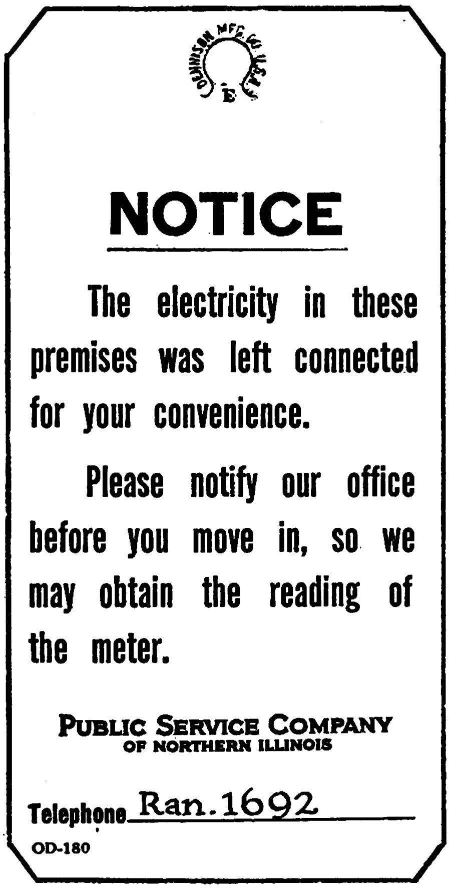
On the job ready to instantly serve the incoming tenant

Some persons contend that such a plan might be excellent for the combination gas and electric company since gas services must be locked off for safety reasons and when application is made for gas the electric application is obtained. It is therefore assumed that it might not benefit the company supplying electric service only.

An analysis of the replies shows that five of the larger utilities in the country furnishing electric service only have experienced very satisfactory results from the adoption of this plan. One of these companies reported, "It has cut down the cost of operation very materially and the losses incurred are so small that they are insignificant."

A comparison of the kilowatt hours charged off annually on these inactive meters, as related to the average monthly number of such meters left in service shows the extremely low loss of from 1.9 kilowatt hours to 2.6 kilowatt hours per year per inactive meter. As these low ratios of losses in inactive meters are found in the larger cities with their cosmopolitan population and more frequent changes in address, it is very probable that even lower loss will be experienced in smaller cities and towns.

The plan of leaving meters installed and connected can be very readily tested for limited periods where there is doubt as to its advantages. It will not in-



NOTICE

The electricity in these premises was left connected for your convenience.

Please notify our office before you move in, so we may obtain the reading of the meter.

PUBLIC SERVICE COMPANY
OF NORTHERN ILLINOIS

Telephone Ran. 1692

OD-180

Typical notice used in connection with the plan

crease the cost of handling service termination orders but will, in fact, lessen it because of the time saved. The only risk attached to a trial of the method is the possibility of loss through unauthorized use and which can be determined monthly. Experience has shown this to be small enough to disregard.

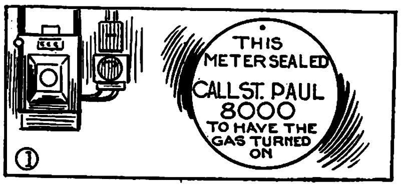
The plan of leaving the meters alive is, briefly, as follows:

When a customer's turn-off order is worked, the meter index is taken to close the account of that customer and the meter is left in service ready for the incoming tenant. A card notice is usually attached to the meter or to a prominent fixture in the house with the information that the electricity is left turned on for the convenience of the incoming tenant. The new customer is requested to notify the company of the date of occupancy so that the name may be entered on the company records. In the majority of cases this causes the desired information to be telephoned in.

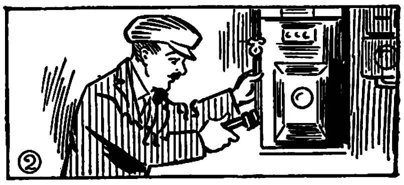
The various companies have adopted different periods for these meters to remain in service as "inactive" meters. Some decide to remove them after a period of six months, others at different intervals ranging up to two years. During this "inactive" period the meter is read each month on the regular call of the meter reader. If a small consumption is found registered, it is the usual practice to charge this off if the premises are still vacant. If there is a recurrence of such use not accounted for, the meter reader notifies the company of consumption on inactive meter and the meter is then ordered removed. If a new tenant is found living on the premises on one of the meter reader's monthly calls, and the meter sheets show that the customer has not applied for service, the name and any other information desired are obtained and sent to the company office. Based on this notice of use, a service request or an application is obtained and the new tenant is charged from the last index taken while premises were vacant, except as discussion with the tenant shows that he is not responsible for the entire use recorded. As a rule very little difficulty is found in having the new customer agree to pay for the said use of service. Most companies have adopted the broad policy that where there is argument concerning such use it is good policy to take the new customer's word and settle the case on a liberal basis. With monthly readings on each meter the losses are naturally quite small.

Our study of present practice of representative companies clearly shows a definite trend in the direction of leaving meters alive when the premises are vacated. Companies are urged to consider it as a means of avoiding delay in giving service and in effecting better relations with our customers. The plan helps create a good first impression which goes far toward gaining the everlasting good-will of new customers.

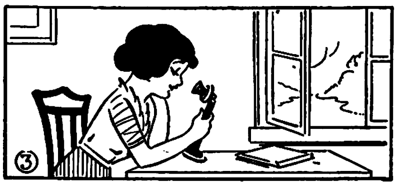
Illustrated story of the plan in operation in a Combined Gas and Electric Company



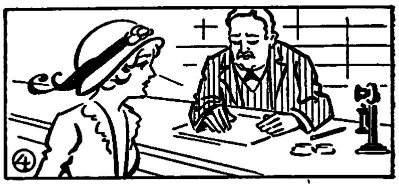
In Baltimore—when home is vacated, gas meter is turned off and tagged. Electric service is always available.



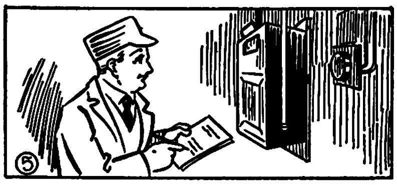
In may other cities—both gas and electric service is discontinued. Meters are taken from home in some cities.



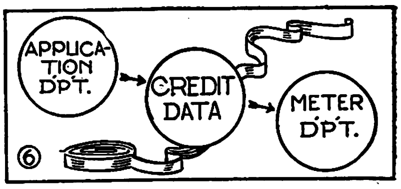
In Baltimore—a telephone call is all that is necessary to have gas service in new home. Electric service is always available.



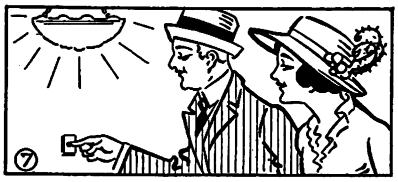
In many other cities—it is necessary to make personal application before one secures gas or electric service.



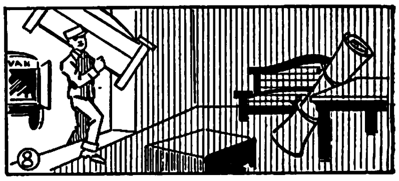
In Baltimore—man reads gas and electric meters—turns on gas. Electric service is always available.


APPLICATION DPT.
CREDIT DATA
METER DPT.
⑥

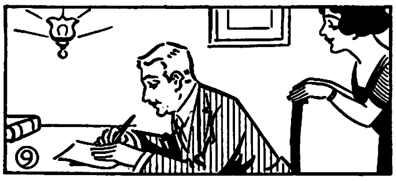
In many other cities—time is lost while application is going through various departments, resulting in delayed service.



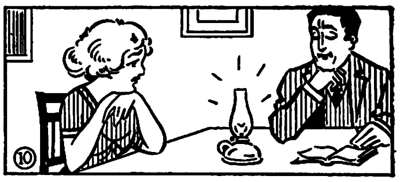
In Baltimore—new tenant moves into new home; gas and electric service facilitates moving—customers pleased with service.



In many other cities—new tenant moves into dark house while application for service is held up through red tape.



In Baltimore—customers sometimes write or call at office to express appreciation of Company's handling of requests for service.



In many other cities—red tape results in dissatisfaction on the part of customers, waiting for illuminating service.

Electrical Research Statistics

September, 1929

Issued Monthly by Statistical Research Department of the National Electric Light Association
420 Lexington Ave., New York, N. Y.

H. A. Snow, *Chairman, Statistics Committee, Accounting National Section*
Wm. M. Carpenter, *Economist*
H. S. Bennion, *Director of Engineering, N. E. L. A.*
Merle Rainey, *Statistician*

The National Electric Light Association, a voluntary organization of companies and individuals affiliated with or interested in the electric light and power industry, organized to advance the art and science of the production, distribution, and use of electrical energy for public service.

The Association maintains a Statistical Research organization which collects, interprets, and makes available basic statistical information on the electric light and power industry. The publications and services of this department are available to all those interested, on request.

Current Statistics of the Electric Light and Power Industry

(As of June 30, 1929)

The data here presented are for the total (100 per cent) electric light and power industry and are based on monthly reports received from some 400 companies, representing over 86 per cent of the industry.

	MAY			JUNE		
DURING MONTHS OF MAY AND JUNE	1929	1928	Per Cent Increase	1929	1928	Per Cent Increase
*Kw-hr. generated (net)	7,597,585,000	6,645,113,000	+14.4	7,295,127,000	6,538,610,000	+11.6
Add—energy imported from Canada and purchased from outside the Electric Light & Power Industry	183,322,000	190,193,000	− 3.7	174,276,000	203,264,000	−14.3
Less—energy used in electric and other departments	197,000,000	215,000,000	− 9.1	184,000,000	200,000,000	− 8.0
Total energy for distribution (kw-hr.)	7,583,907,000	6,620,306,000	+14.6	7,285,403,000	6,541,874,000	+11.4
Sales of energy in kw-hr. for:						
Farm service (not involving irrigation)**	6,706,000	....	....	7,900,000		
Farm service (involving irrigation)**	133,300,000	....	....	149,273,000		
Domestic service	739,267,000	612,415,000	+20.7	687,055,000	583,844,000	+17.6
Commercial service:						
Small light and power	1,047,733,000	863,776,000	+21.3	1,038,088,000	881,489,000	+17.8
Large light and power	3,909,260,000	3,367,235,000	+16.1	3,917,620,000	3,435,668,000	+14.0
Railways and railroads (motive power)	438,700,000	427,890,000	+ 2.5	408,600,000	410,310,000	− 4.2
Other sales to ultimate consumers	159,947,000	142,990,000	+11.9	154,039,000	136,563,000	+12.8
Total sales to ultimate consumers (kw-hr.)	6,294,907,000	5,414,306,000	+16.3	6,205,403,000	5,447,874,000	+13.9
Total revenue	$166,309,000	$149,029,000	+11.6	$163,569,000	$149,210,000	+ 9.6
Revenues from sales for resales and miscellaneous (included above)	9,726,000	7,892,000		9,520,000	8,130,000	.....
DURING THE TWELVE MONTHS ENDING	MAY 31, 1929			JUNE 30, 1929		
*Kw-hr. generated (net)	86,257,369,000	....	....	87,013,886,000	....	....
Add—imports from Canada and purchases from outside the Electric Light & Power Industry	2,226,195,000	....	....	2,197,207,000	....	....
Less—energy used in electric and other departments	2,576,000,000	....	....	2,560,000,000	....	....
Total energy for distribution	85,907,564,000	....	....	86,651,093,000	....	....
New generating capacity installed (kw.)	1,921,000	....	....	Data Being Revised	....	....
Number of new customers added:						
Farm customers	....	....	....		....	....
Domestic customers	1,183,000	....	....		....	....
Commercial customers	244,000	....	....		....	....
Others	1,000	....	....		....	....
Total customers added	1,428,000	....	....		....	....
Important factors:						
Percentage of energy generated by waterpower	38.6	....	....	38.3	....	....
*Average pounds of coal per kw-hr. generated	1.69	....	....	1.69	....	....
Domestic service (residential use):						
Average annual consumption per customer (kw-hr.)	476	....	....	478	....	....
Average revenue per kw-hr	6.40c.	....	....	6.40c.	....	....

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*By courtesy of the U. S. Geological Survey with deductions for plants not considered electric light and power enterprises.

**As reported by 197 companies only, included in figures below.

Basic Information on the Electric Light and Power Industry

As of June 30, 1929

The data included in this table are basic factors of the electric light and power industry and will be brought up-to-date at the end of each month and published in each issue of the Bulletin.

1. Value of plant and equipment (estimated)	$10,300,000,000
2. Total generating capacity in kw	
Steam	data being revised
Waterpower	data being revised
Internal combustion	data being revised
3. Total number of customers served*	23,618,000
Farm customers (as reported by 190 companies only)***	336,000
Domestic customers	19,430,000
Commercial customers	4,157,000
4. Population in electrically lighted homes (Electrical World)	82,500,000
5. Percentage of homes which are served with electricity	67
6. Miles of transmission lines (11,000 volts and above) (circuit miles)	150,000**

* Subject to slight further revision. ** As of January 1st. *** Included below.

Summary of the Operations of the Electric Light and Power Industry During the First Half of 1929

THE extraordinary activity which has characterized manufacturing operations since January has been reflected in a remarkable increase in the output of electric energy by the light and power enterprises of the United States, the Statistical Research Department of the National Electric Light Association reports in a summary of electric service for the first half of 1929.

During the six months ending June 30, the total sales of large industrial power were 21,898,000,000 kilowatt-hours, an increase of more than 14 per cent over the corresponding period last year. This is directly in line with the figures of the Electrical Index of Industry and Trade, shown on the adjoining page, which gives an average condition of business activity of practically ten per cent above "normal," as compared with only five per cent above "normal" during the first six months of 1928, which degree of activity is substantiated by the various standard indexes prepared by other agencies.

Large Increase in Domestic Service

Equally striking is the large increase in the use of domestic service. For the first six months of the year, the total sales of electricity for lighting, cooking and appliances in the 19,400,000 electrified homes of the nation were 4,981,000,000 kilowatt-hours, an increase of 670,000,000 kilowatt-hours (or nearly 16 per cent) over the corresponding period of 1928. While part of this increase is due to the addition of new customers to the companies' lines, the larger part has been the result of the use of more kilowatt-hours in the individual home. At the end of December, the annual use of current by the average residential consumer was 459 kilowatt-hours. At the end of last June this figure had risen to 478 kilowatt-hours—an increase of more than four per cent. At the same time, however, this increase in use was accompanied by a decrease in the average rate, which declined by 15/100 of a cent per kilowatt-hour, or by nearly 2½ per cent, leaving the annual revenue *per consumer* substantially unchanged.

While the average use per consumer (with the exception of transportation, where the increase in steam-railroad electrification has almost been offset by the decline in the requirements of street railways) has thus shown a remarkable growth, the *number of new consumers* has, however, decreased very significally. This is, in part, the result of the fact that the aggregate of unwired houses in urban communities has rapidly diminished and, in part, the result of a very pronounced slump in residential construction throughout the United States. (See note on adjoining table of homes receiving electric service).

More Sales at Lower Rates

The tabulation of six months' operation shows that revenues have not kept pace with the increase in sales. Whereas the energy sold to consumers increased by 13½ per cent, the revenues which these consumers paid increased by only 8½ per cent. This gain in revenues is substantially the same in amount (and slightly less in percentage) as has prevailed during the past three years—in spite of the great spurt in industrial business and in the use of electricity in homes. It emphasizes once more the continuation of the electric light and power industry's general policy of passing on to the consumer the benefits of improved engineering and management. It nevertheless raises a question as to the further gain in gross revenues if, perchance, the present state of industrial activity should descend from its unusually high level and approach the figures which long-time trends in the various lines of industry and trade have approximated as "normal." For this reason, prophesy at this time as to the results for the entire year—alluring as such an effort may be—cannot seriously be undertaken.

Electric Light and Power Industry—Six Months' Summary

The data here presented are for the total (100 per cent) electric light and power industry and are based on monthly reports received from some 400 companies, representing over 86 per cent of the industry.

	1929	1928	Percent Increase
DURING SIX MONTHS ENDING JUNE 30th			
*Kw-hr generated (net)	44,401,701,000	39,266,275,000	+13.1
Add—energy imported from Canada and purchased from outside electric light and power industry	1,083,883,000	1,262,741,000	—14.1
Less—energy used in electric and other departments	1,270,000,000	1,339,000,000	— 5.1
Total energy for distribution (kw-hr)	44,215,584,000	39,190,016,000	+12.8
Sales of energy in kw-hr for:			
Farm service (not involving irrigation)**			
Farm service (involving irrigation)**			
Domestic service	4,980,784,000	4,310,977,000	+15.5
Commercial service:			
Small light and power	6,508,003,000	5,682,326,000	+14.5
Large light and power	21,897,996,000	19,124,724,000	+14.5
Railways and railroads (motive power)	2,775,140,000	2,755,856,000	+ 0.7
Other sales to ultimate consumers	1,066,661,000	955,134,000	+11.7
Total sales to ultimate consumers (kw-hr)	37,228,584,000	32,829,016,000	+13.4
Total revenue	$1,027,251,000	$ 945,831,000	+ 8.6
Revenue from sales for resale and miscellaneous (included above)	$56,855,000	$53,060,000	+ 7.2

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*By courtesy of the U. S. Geological Survey with deductions for plants not considered electric light and power enterprises.

**As reported by 197 companies only, included in figures below.

Sixty-seven Per Cent of the Nation's Homes Now Use Electric Service

An analysis just completed by the association shows that at the end of June 19,430,000, or 67 per cent of the homes in the United States, were wired and received electric service daily. During 1928 more than one million domestic consumers were added to the lines of the light and power companies, which, added to the number of homes receiving electric service for the first time during the previous seven years, means that from January 1, 1920, to December 31, 1928, no less than 9,647,000 American homes were electrified. In certain States, such as New Jersey, New York and California, practically all homes are wired.

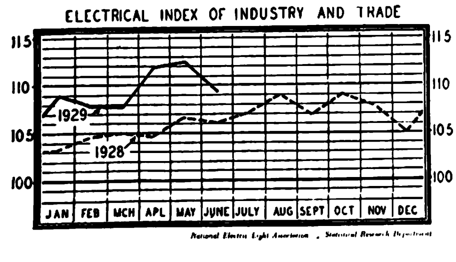
As compared with the first of the year, several of the States (noted as (a) in the table) show actual declines or else gains which appear to be unusual. This is largely due to seasonal characteristics. Many of the meters are temporarily in service in summer homes and, *per contra,* are out of service in winter residences. For this reason, the increase of only 360,000 during the first six months cannot be multiplied by two to give the probable annual gain in domestic customers. At the same time it compares with a figure of 532,000 for the corresponding period of last year, and so emphasizes the degree to which the diffusion of electric service throughout the country has been accomplished.

N. E. L. A. Index of Industry and Trade

	1927	1928	1929
January	104.9	103.2	109.0
February	103.8	104.7	107.9
March	106.9	105.0	107.9
April	106.8	104.6	112.0
May	106.3	106.6	112.5†
June	106.1	106.0	9.7*
July	104.8	107.1	
August	104.9	108.9	
September	104.8	106.8	
October	102.6	109.0	
November	102.9	107.8	
December	103.1	105.0	

*Subject to revision. †Revised.

Some irregularity in production and in general business is shown by the statistics of the output of the country's electric light and power plants, as reported for June by the United States Geological Survey.



National Electric Light Association . Statistical Research Department

Number of Homes Which Are Served with Electricity by the Electric Light and Power Industry

(Adjusted to latest census figures and determined from monthly reports to the N. E. L. A. from 400 Utility Companies. which serve 80 per cent of all electric consumers in the U. S. From these comprehensive data, the Statistical Research Department has extended calculations to give the complete information both for the entire U. S. and for the individual States.)

	Total Number of All Homes	Number of Meters in Service on Domestic Consumers' Premises			Ratio: Meters to Homes June 30 1928
		On Dec. 31, 1927	On Dec. 31, 1928	On June 30, 1929	
Alabama	575,000	135,000	148,000	152,000	26%
Arizona	118,000	41,000	47,000	47,000	40
Arkansas	458,000	87,000	96,000	100,000	22
California	1,235,000	1,305,000	1,378,000	1,388,000(a)	(b)
Colorado	270,000	161,000	169,000	169,000	66
Connecticut	395,000	328,000	343,000	349,000	88
Delaware	61,000	29,000	32,000	33,000	54
Dist. of Col.	128,000	97,000	106,000	109,000	85
Florida	360,000	202,000	198,000	169,000(a)	47
Georgia	718,000	142,000	170,000	172,000	24
Idaho	133,000	67,000	69,000	70,000	53
Illinois	1,829,000	1,482,000	1,534,000	1,551,000	86
Indiana	820,000	531,000	546,000	557,000	68
Iowa	608,000	358,000	371,000	377,000	62
Kansas	472,000	251,000	259,000	265,000	56
Kentucky	598,000	203,000	217,000	223,000	37
Louisiana	436,000	130,000	136,000	142,000	33
Maine	200,000	141,000	148,000	156,000(a)	78
Maryland	380,000	223,000	239,000	247,000	65
Massachusetts	1,011,000	891,000	945,000	950,000(a)	93
Michigan	1,117,000	832,000	896,000	917,000	82
Minnesota	625,000	370,000	384,000	384,000	61
Mississippi	418,000	61,000	72,000	73,000	17
Missouri	885,000	526,000	537,000	542,000	61
Montana	187,000	60,000	63,000	64,000	34
Nebraska	338,000	180,000	187,000	191,000	57
Nevada	22,000	12,000	13,000	14,000	63
New Hampshire	114,000	82,000	96,000	97,000	85
New Jersey	907,000	794,000	862,000	897,000	99
New Mexico	91,000	24,000	27,000	29,000	32
New York	2,848,000	2,676,000	2,908,000	2,970,000	(b)
North Carolina	596,000	173,000	186,000	195,000	33
North Dakota	134,000	47,000	52,000	55,000	41
Ohio	1,736,000	1,169,000	1,245,000	1,286,000	74
Oklahoma	547,000	181,000	202,000	211,000	38
Oregon	229,000	173,000	191,000	194,000	85
Pennsylvania	2,325,000	1,542,000	1,641,000	1,680,000	72
Rhode Island	169,000	143,000	155,000	154,000(a)	91
South Carolina	392,000	67,000	81,000	82,000	21
South Dakota	158,000	61,000	65,000	66,000	42
Tennessee	572,000	175,000	184,000	187,000	32
Texas	1,266,000	464,000	508,000	525,000	41
Utah	120,000	97,000	98,000	97,000	81
Vermont	86,000	60,000	65,000	66,000	77
Virginia	554,000	172,000	184,000	191,000	34
Washington	425,000	330,000	352,000	355,000	83
West Virginia	380,000	125,000	140,000	146,000	38
Wisconsin	696,000	458,000	494,000	506,000	73
Wyoming	65,000	28,000	30,000	30,000	46
Total U. S.	28,808,000	17,886,000	19,069,000	19,430,000	67%

(a) Seasonal variation involved due to summer homes being opened or winter homes closed.
(b) Over 100%. Due either to classification of meters, or to estimated population, or both.

According to these figures, the Electrical Index of Industry and Trade, prepared by the association, indicates that business in June was 9.7 per cent above the normal for that month, as measured by the trends of the past ten years. This is a drop of almost three per cent from the high figure for May (12.5), but still represents a substantial increase over the level of 6.0 per cent which prevailed in June of last year.

The N. E. L. A. Index of Industry and Trade is based upon the deviation of the total output of electricity by all agencies which contribute to the public supply, plus imports from Canada, from a computed "normal" figure for each month, which "normal" is adjusted for the continued growth of the light and power industry and is further corrected for seasonal variation as indicated by the monthly totals of the past ten years.

ENGINEERING SECTION

Alex. D. Bailey, *Chairman* **H. S. Bennion**, *Director of Engineering, N. E. L. A.*

Annual Reports of Engineering National Section Committees

Editor's Note: Herewith are continued the summaries of the activities of Committees of the Engineering National Section during the administrative year 1928-1929. This information, in previous years has been presented in the form of reports to the National Convention. It is now felt, however, that because of the nature of the reports, and the greater and more diversified circulation of the N. E. L. A. Bulletin, that the reports would prove of wider usefulness if published in this medium.

Report of Electrical Apparatus Committee

J. Allen Johnson, *Chairman*

THE Committee has followed the same general plan as for the last several years of having a few subcommittees, each of fairly broad scope.

The Subcommitte on Fundamental Plan of Systems was discontinued, its work having been transferred to the new Power Systems Engineering Committee.

Two new standing subcommittees were created. That on National Code Revisions is charged with the duty of keeping the committee informed and assisting in shaping its policy in code matters. That on Publications is charged with the duty of studying and developing the committee's publication policies and practices and with assisting and furthering the exchange of information between the Geographic Division Committees and the National Committee.

During recent years a demand has arisen among operating men for a common meeting ground. This demand has shown itself through the formation of "operating committees" in several of the Geographic Divisions. This demand may be attributed partly to the many interconnections and consolidation between formerly isolated utilities, requiring coordination of operating practices, and to the creation, partly as a result thereof, of a large group of operating engineers charged with responsibility for service, but free from the exacting requirement of actual superintendence, and thus able to get away from their jobs occasionally to exchange ideas and experiences with their fellows. The most suitable existing medium for meeting this demand is the Operating Practice Subcommittee of the Electrical Apparatus Committee, and accordingly this subcommittee was expanded to include a larger number of such operating engineers.

Meetings and Discussions

Four two-day meetings were held during the year, with an average attendance of about 75. Prepared articles and reports presented at these meetings and summaries of discussions which took place are available in the committee's minutes.

Serial Reports

The following Serial Reports were published during the year:

1. "Progress in Generator Design and Practice." (N. E. L. A. Pub. 289-37.)
2. "Outline of Fundamentals of System Interconnections." (N. E. L. A. Pub. 289-60.)
3. "Storage, Handling, Treatment, Inspection and Testing of Insulating Oils." (N. E. L. A. Pub. 289-48.)
4. "Uniform Records of the Electrical Operation of Power Systems." (N. E. L. A. Pub. 289-52.)
5. "D.C. Substation Design Practice." (N. E. L. A. Pub. 289-82.)

Bulletin Articles

In addition to reports of all meetings, the following articles were published in the N.E.L.A. Bulletin:

1. Symposium on Layout of a Hypothetical Substation. (Published serially in September, October and November, 1928.)
2. Symposium on Design of High Voltage Outdoor Substations. (Published Serially in December, 1928, January, February and March, 1929.)
3. Reliable Time Delay Under Voltage Devices Now Available. (March, 1929.)
4. Miniature Control Switchboards. (April, 1929.)
5. Transformers and Regulators. (April, 1929.)
6. Preferred Voltage Ratings for A.C. Systems. (April, 1929.)

Formal Actions

The following resolutions were adopted during the year:

(1) *Resolved,* That the revised schedule of Preferred Voltage Ratings, September, 1928, be approved as a satisfactory working plan, to meet existing and future needs of the industry.

(2) *Resolved,* That Paragraphs 13-600, 13-601, 13-602 and 13-603 on Recommendations for the operation of transformers on a temperature basis published by the A. I. E. E. in the Report on Standards for Transformers, Induction Regulators and Reactors (proposed revision of present standard Section 13), dated August, 1928, are hereby approved by the Electrical Apparatus Committee as a suitable basis for securing operating experience on the effect of operation of transformers at ambient temperatures other than 40 deg. C. for air and 25 deg. C. for water.

(3) *Resolved,* That the Apparatus Committee empower its Chairman to take such official action as is necessary to coordinate these groups (N. E. L. A., N. E. M. A., A. E. I. C., A. E. R. A., A. R. A., A. I. S. E. E. and others), to the end that cooperative action may be established (in the matter of standardization of oil circuit breakers).

(4) *Resolved,* That the Electrical Apparatus Committee subscribe to the recommendation of the United States National Committee of the I. E. C., that no change be made in the present standard ambient temperature of 40 deg. C. for rating electrical equipment.

(5) *Resolved,* That the Electrical Apparatus Committee recommends that on and after January 1, 1931, 110 volts be dropped as a "nominal system voltage." Attention is, however, directed to the fact that actual voltages exist which make it inadvisable to re-design appliances and motors for nameplate voltages other than those now used.

Report of the Hydraulic Power Committee

Byron E. White, *Chairman*

THE Hydraulic Power Committee has had a very successful year marked by the production of a number of serial reports of considerable value. They relate to the following subjects: power house cranes, penstock design, penstock valves, spillway gates, hydro-electric units as synchronous condensers, reliability of hydro-electric units, and a combined series of manufacturers' statements and bibliography of hydro-electric subjects.

These reports contain several noteworthy additions to the literature of hydro-electric engineering, and include considerable design data and suggested practice which will be of assistance in carrying out the principal objective of the Engineering National Section; namely, more kilowatt hours and more kilowatts per dollar of investment.

Very substantial and gratifying progress has been made in the work of the subcommittee charged with cooperative efforts in connection with the U. S. Bureau of Fisheries, looking to a solution of the fishway problem. The electric fish screen for directing the movements of fish and preventing their entry into regions where they are unwanted, has proved to be quite successful.

The problems of speed or frequency regulation, and proper division of load between units in a plant, and between plants in an interconnected system, has become much more acute as larger and larger regions have been tied together by substantial transmission links. As an outgrowth of this, there has recently appeared a definite need for better equipment for the regulation of frequency and division of load, either as an integral part of the customary governors, or in separate apparatus. A new Subcommittee on Governors has made very substantial progress in outlining the requirements, and is proceeding to get together the experience of operating companies, manufacturers, and others, with existing types of apparatus, and will no doubt outline the requirements of additional apparatus which may be necessary for the purpose, and not now available.

The comparatively recent and disastrous failures of certain dams has also impelled the Committee to entrust to a subcommittee the duty of endeavoring to outline a suitable study of such failures, and of the details of dams, with a view to making proper recommendations, tending to result in safe practice in the construction of dams.

Another subcommittee is keeping in close touch with a number of individuals and companies who are endeavoring to perfect means of forecasting future water supply for hydro plants. This is a most important subject, and while progress is slow, new information and new ideas of a practical sort are constantly developing, and through the Committee are given to the members and broadcast to interested operating companies.

Recent practice in the design of automatic and semi-automatic hydro plants is being summarized by another subcommittee.

The subject of protective coatings of paint for penstocks is also being investigated with a view to putting in the hands of operating companies the accumulated experience data of the industry as rapidly as they are developed.

The problems of operation of hydroelectric plants will be considered by a special subcommittee, which has recently been appointed.

Other subjects which will be studied by recently appointed subcommittees are the welding of water wheels, electric arc welded pipes, the fatigue of metals in penstocks, and vacuum breakers as applied to hydro-electric units.

The Subcommittee on Water Wheel Testing consists of members of the Hydraulic Power Committee, who are designing and constructing engineers, and representatives of the principal water wheel companies. This subcommittee is concerning itself with problems relating to the improvement of the design and operation of hydraulic turbines and their appurtenances, and is in effect a Conference Committee.

Prospectus of Work of the Hydraulic Power Committee for 1929-30

BYRON E. WHITE, *Chairman*

THE province of the Hydraulic Power Committee includes the consideration of all technical matters relating to water power, water storage, machinery and structures whereby water power is turned into energy to drive electrical generators. While great perfection has been attained in hydraulic turbines and related apparatus and structures, and efficiencies of turbines have risen to considerably in excess of 90 per cent, thus leaving little to be attained, there are still many important problems with which engineers may contend, with the definite promise of worthwhile results.

The economics of hydro-electric versus steam and other fuel power production has been forced to the front by the rapidly increasing efficiency, and consequently decreasing cost of fuel generated energy. As a result, hydraulic engineers are being forced more and more to consider not only the original construction cost, but also its maintenance, depreciation, obsolescence, and operation.

With this situation facing hydraulic engineers, many practices and many types of structures and machines, which had been considered standard for years, have been found in need of examination as to the possibilities of further improvement, cheapening, or the development of alternative and more economical constructions or methods.

In order to cope with these problems, the Hydraulic Power Committee has organized a considerable number of subcommittees designed to study and report on specific phases of hydraulic engineering.

The Water Wheel Testing Subcommittee, composed of representatives of the utilities and of the principal water wheel manufacturers, is attempting to coordinate the viewpoints of the users and the makers of hydraulic equipment, with a view to meeting the requirements mentioned above. Through wholehearted and friendly cooperation, it is hoped and expected that much of the difference in viewpoint between these two extremes may be compromised, for the good of all.

Another subcommittee is watching all current developments in the highly abstruse and speculative field of forecasting water supply, the very life-blood of hydro-electric power. Several promising developments in this line have been brought to its attention, and valuable progress is being made. The subcommittee will make these available to the industry as rapidly as they are brought out and proven to have value.

A valuable report on penstocks of various materials is being assembled, and will undoubtedly be published in the autumn of 1929. Much new material has been brought to light, and more is in the making. A subcommittee is studying the use of welded steel pipes for penstocks, while another subcommittee is studying the fatigue of metal in penstocks, evidences of which have recently been discovered.

A report which will be a compendium on automatic and semi-automatic hydro plants is also in the making, and should prove of value to all who are interested in such plants.

The subject of protective coatings for penstocks is being investigated by a special subcommittee, but on account of the nature of the problem and the long periods of time which must elapse before definite conclusions regarding a coating may be drawn, it is likely that the final report may be delayed for a long time. Any worthwhile developments along this line, however, will be brought out periodically by the subcommittee, and made available to the industry.

With the development of vast interconnected systems covering large geographic areas, the problem of frequency or speed regulation has become very prominent, and more or less acute. A special subcommittee is investigating hydraulic turbine governors and frequency control equipment, and is fortunate in having the complete cooperation of those who have developed the most recent and most promising frequency control equipment. Something tangible may be expected in the way of a report from this subcommittee before the end of the present administrative year.

The problem of fishways, fish stops and screens, which is acute in the Northwest, is being cooperatively studied on a working basis by a special subcommittee, which is cooperating with the utilities in the Northwest and the U. S. Bureau of Fisheries. Valuable and promising results have already been obtained, and the program for the coming year is such as to assure still further, and perhaps more or less final results.

Recognizing that the committee had heretofore been made up principally, if not almost exclusively, of designing engineers, a number of operating men have recently been made members. A subcommittee on Hydro Operating Practices has been organized, whose function will be to consider problems of operation of hydro-electric plants and systems, and to cooperate with the main committee and other subcommittees by injecting the operating point of view into their deliberations and reports.

A subcommittee on the Welding of Water Wheels has also been constituted to take up and extend a study previously made, and particularly to consider the use of recently developed bronzes which have shown remarkable resistance to pitting. It is hoped that the work of this subcommittee will aid greatly in finding a solution to this troublesome problem and thus reduce the cost of maintenance work and the outage of units, brought about by the pitting of runners and other appurtenances.

Another subcommittee is preparing a report on vacuum breakers for hydroelectric units, which is expected to be published during the coming year.

A special subcommittee is endeavoring to outline a procedure by which it can carry on a study and make a report dealing with the essential features of dams, with the object of giving to hydraulic engineers more positive data in regard to the stability of various types of dams and proper methods of construction than now is available.

A number of other subjects not listed will come before the Committee for consideration as to whether or not they are of sufficient interest and value to warrant their consideration and the making of reports upon them by special subcommittees.

In conclusion, it is proper to emphasize the fact that this is a working committee of men who are intimately identified with hydro-electric work, animated by a cooperative spirit and a desire for knowledge. The intimate personal acquaintanceship which has been established at the meetings, and even more particularly during the two inspection trips last year, have been productive of much good to all concerned, through the interchange of personal knowledge and experience. Much of this interchange of information would not have been brought about were it not for the close relations of these men over periods of several days. For that reason it can be asserted that the inspection trips are more than worthwhile, while the more or less formal meetings of the Committee serve to crystallize the ideas which have been previously partly developed. Executives are therefore earnestly requested to permit such of their subordinates as are members of the Committee to participate fully in the semi-annual meetings, and in the inspection trips as well, as it is only in this way that the maximum tangible benefits can be secured by the individual companies and members.

The 1929-30 Program of the Accident Prevention Committee

C. R. Beardsley, *Chairman*

FOR several years the Accident Prevention Committee has aimed to increase the interest and pressure exerted by key men and executives. Observation has proved without question, that the companies having the best records of accident elimination are those in which safety effort begins at the top. Whether applied to the whole company or to a department or a small group, the trend is very largely determined by the attitude of the man in charge.

It is thought by some that the National Accident Prevention Committee has no mandate to stimulate Geographic Divisions or Member Companies to higher performance, but that the initiative should be within the Geographic Divisions. The majority view, however. has decided the course of pointing out accident experience trends and otherwise endeavoring to secure greater local effort, particularly where the records are not favorable in comparison with national averages.

The program for 1929-30 therefore has two main divisions: (1) detail studies of hazards. safe practices, training employes; (2) cooperation with other bodies such as National Safety Council, American Gas Association, and with other groups in the N. E. L. A. (Divisions, Committees, Member Companies) in promoting the safety activities and use of information prepared under the first classification.

Among the detail studies to be made on hazards and safe practices are the following (Several are nearing completion):

Accident Cause Analysis—Ascertain chief causes.

Automobile Accidents—Study training of drivers.

Cable Identification—Complete study of marking or checking identity.

Construction — Hydro-electric plant construction hazards, etc.

Fire Prevention — Review of fire causes and fire fighting methods as to human safety.

Handbook of Safety Training—Outline of training for foremen.

High Voltage Tests — Study of kenotron testing.

Hot Line Tools—Safety in live line work.

Interlocks—Study of methods of compelling correct sequence and protection in switching operations and grounding for protection of workmen.

Low Voltage Hazards — Continue work started in 1928-29.

Resuscitation—Find means to spread knowledge.

Rubber Gloves—Complete the study of glove development and practices.

Safety Provisions—Complete the catalog of methods, devices and appliances.

Tree Pruning—Complete the study of tree pruning methods.

The program for securing greater interest includes the following items:

Cooperation with National Safety Council—A conference called at Pittsburgh during the Summer was attended by representatives of N. S. C., N.E.L.A., A. G. A., and the Telephone and Telegraph group, all of whom are associated in the Public Utilities Section of the National Safety Council. A program was prepared aiming to avoid duplication, cross purposes, and wasted effort, and leading to mutual support and concentration of effort.

Codes—Study proposed codes as to safety features.

Cost of Accidents—Study costs for reporting to executives.

Editing and Publicity—Edit and circulate data.

Educational Institutions — Interest Engineering students.

Geographic Divisions—Correlate and stimulate work in the divisions. A manual for Geographic Division chairmen is in circulation.

Statistics—Make a careful study of data at hand for use in stimulating activity. This is well under way.

As these studies progress it is hoped to secure publication of salient facts in the N. E. L. A. Bulletin, *Electrical World* and elsewhere for the widest possible spread of the information.

It should be emphasized that this is not a single year's program, but part of a course determined a few years ago with a definite objective attack. It is proposed to lay out work ahead in conjunction with the other safety organizations so that all efforts will be coordinated and effective.

Inductive Coordination Problems in Joint-Use Lines Under Study by Joint Committee

THE advantages gained by the joint-use of pole lines in urban communities are fully recognized and the practice of carrying power-distribution circuits and telephone subscriber circuits on the same pole line is now very common. Due to the rapid extension of open-wire power and telephone circuits into rural communities, the extension of joint use to this class of service appears desirable for many reasons. However, since the physical separation of the two classes of circuits under above conditions is small, usually 4 to 6 feet, the problem of inductive coordination of the circuits to prevent excessive noise in the telephone lines requires considerable study. Project Committee No. 6* has been investigating the technical problems of inductive coordination that are involved in exposures of these types. Experimental work was carried on for two years at Minneapolis, where particular attention was paid to problems arising with open-wire power-distribution systems and local telephone circuits in cable. The results of these tests are presented in Engineering Report No. 6 of the sub-committee. Since the completion of the Minneapolis field work, the project committee has been continuing its investigation at Elmira.

Scope of Elmira Investigation

The investigation at Elmira is primarily concerned with the second type of joint-use exposures mentioned above, viz., those in which both the power and telephone circuits are in open-wire. In scope, the work includes:

1. A detailed study of the source and magnitude of noise-currents produced in various types of telephone circuits when exposed, at joint-use separation, to various types of power-distribution circuits.
2. The study and development of remedial measures which may be effectively used to decrease the susceptiveness of the telephone circuits and to decrease the influence of the power circuits.
3. The development of a practical set of empirical formulas for use in solving certain types of inductive coordination problems.

Testing Facilities

The testing facilities include an 8-mile section of toll-lead which was scheduled for dismantling, 2½ miles of which have been reconstructed in accordance with present standards of joint-use construction. The line is located 7 miles west of Elmira, N. Y., along the Delaware, Lackawanna & Western R. R. right-of-way. Four power conductors and 30 telephone conductors are provided in the 2½-mile section, all terminating in a test-house. The test-house and the configuration of the line are shown in the illustration. The circuits shown on the opposite side of the right-of-way are the signal and automatic train-control circuits of the railroad company. Termination boxes are provided in the experimental line at half-mile intervals, as a means of varying the length of a test section. A 2000-foot length of telephone cable extends from one end of the line and is used to determine the effect of an entrance cable on noise induced in open-wire circuits. The test-house contains equipment for energizing the power circuits at frequencies from 60 to 3000 cycles, and for measuring the induced currents and voltages in the telephone circuits. Tests of this nature require the measurement of extremely small voice-frequency currents and voltages. A telephone circuit analyzer, developed by the Development and Research Dept. of the A. T. &. T. Company, capable of measuring a current of .05 microamperes at an input impedance of only 600 ohms, is used for these measurements. Its frequency-selectivity permits the measurement of the individual frequencies in a composite wave.

Experimental Line Tests

The work covered under Item 1, above, involves mainly the determination of the coupling between power and telephone circuits and the susceptiveness of telephone circuits under the wide range of conditions that occur in practice. Coupling coefficients have been obtained for single-phase and three-phase energization of the power circuits. Since the power and telephone circuits are in open-wire, the longitudinal-circuit and metallic-cirinduction, both current and voltages are important in the telephone circuits. A complete determination of the coupling, therefore, requires measurements of both the longitudinal-circuit and metallic-circuit coefficients for two methods of energization: (1) with the far end of the power line open and isolated, to give mainly voltage induction, and (2) with the far end shortened, to give mainly current induction. These data have been obtained for a variety of power circuit configurations.

The susceptiveness of the telephone circuits is determined by measurements of the metallic-circuit current or noise that results when circuit unbalances are acted upon by a given amount of longitudinal induction. The effects of individual unbalances are measured separately as a means of determining their relative importance, and combined to get the overall results.

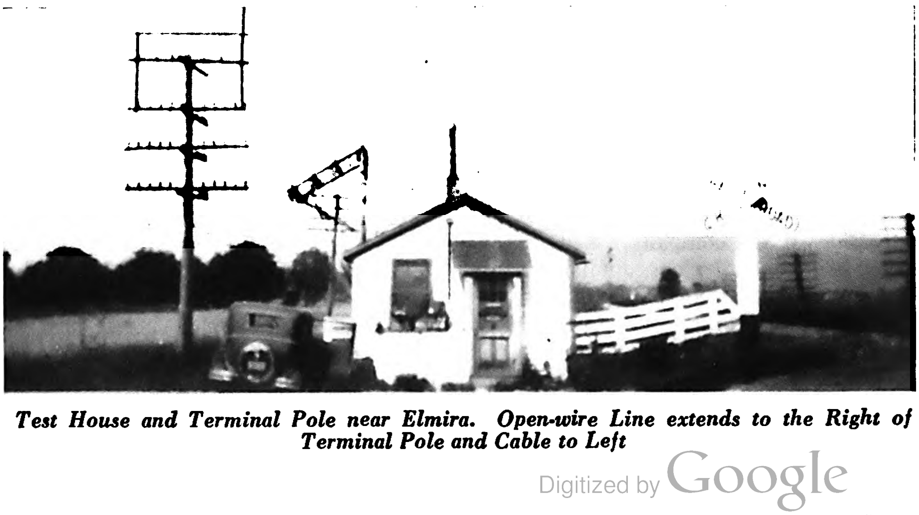
Where practical, measured quantities are checked by computation as a means of extending the range of the experimental work. This also serves as a check on the accuracy of the data.

Empirical Formulas

The results of the various tests are being reduced to empirical formulas which will aid in the solution of everyday field problems. The remainder of the field work in Elmira will consist largely in trying out these formulas on local power and telephone circuits.

Tests on Automatic Train Control Systems

Before the regular program of work was started, a series of tests were carried out in cooperation with the D., L. & W. R. R. Co. to determine if interference with their automatic train control system would result from 60-cycle energization of the experimental line. The continuous two-speed inductive type of control system was used and operated at a frequency of 60 cycles. The train control system was later changed to 100-cycle operation and the tests repeated. Although this work did not fall within the scope of work of Project No. 6, these tests presented an opportunity to obtain some important information.



Test House and Terminal Pole near Elmira. Open-wire Line extends to the Right of Terminal Pole and Cable to Left

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* Of the Joint Subcommittee on Development & Research of the Bell Telephone System and the N E L A.

WOMEN'S COMMITTEE

Miss Sara Harris, *Chairman* Miss Isabell Davie, *Secretary*

News Letter

By Mrs. Thelma Van Ness
Publicity Chairman

THE Women's Committee of the Southern California Edison Company at Los Angeles, according to a report by Mrs. Jeannette I. Rees, chairman, has just completed a very active and successful year. One of the features of the work was a First Aid Team, Miss Alice Smith, captain, which won second prize in the State First Aid meet. At the meeting following the 1928 Pacific Coast Division N. E. L. A. Convention, First Aid was the subject for discussion and so much enthusiasm was aroused that a large number of the girls signed up for a First Aid Lecture Course, carried on during noon hours. This course lasted about six weeks and resulted in the formation of their prize girls' team.

Last fall this group took up the study of government ownership, Boulder Dam, etc., and even presented an original playlet on the Colorado River proposition at one of its meetings. Appliances and stock were discussed at length as suitable and practical Christmas gifts at their November and December meetings. In March of this year over two hundred girls made an inspection trip to the Long Beach steam plant. A private train of six coaches carried this enthusiastic crowd of Edison girls to and from Long Beach and a detour was made on the way down to enable the girls to visit the Lighthipe substation.

Mrs. Phyllis Vauchelet was the first prize winner in the essay contest held by the Southern California Edison Company and Miss Helen McMillan of the Montebello district office won against all other Edison contestants in the Pacific Coast Division three-minute public speaking contest on the subject of "Use It Yourself."

* * *

Northwestern Echoes, published by the Women's Committee of the Northwestern Public Service Company, Huron, S. D., contains a number of interesting news items pertaining to the operation of the company. Line extensions, boiler installations, appliance sales, meter schools and company statistics are topics included in the brief paragraphs of interest to the Women's Committee.

* * *

The *Live Wire Newsette,* published by the Women's Committee of the Iowa-Nebraska Light and Power Company, reports a number of active groups. The Clarinda Live Wires prepared their own dinner at the June meeting and have planned a picnic and swimming party at which they will learn the Prone Pressure Method of Resuscitation. At Maryville, Miss Hilda Lahr received $10 prize money as a result of her iron sales during the Hotpoint Iron activity. At Avoca the girls have made a close study of appliances. Every girl in this group can demonstrate the ironer.

* * *

Occasioned by the recent Public Speaking Contest held in the Southeastern Division, each committee of the Florida Power and Light Company will continue to stress this important subject. A series of brief talks on "Electricity in the Home" are now being conducted by the Palatka Committee under the Chairmanship of Miss Katherine Lattimer. Renewed activity in First Aid is also being reported by the various committees of this company. A study class is being organized by the Miami Committee.

A grand prize of $50 was awarded Miss Irene Hinton of the Sanford office for her paper submitted in the Florida Power and Light Company's first Public Relations Program Contest.

* * *

In connection with the July meeting of the Illinois Northern Utilities Company Women's Committee at Dixon, a discussion of refrigeration was held. Two contests open to the girls terminated at this meeting; one an essay contest on the subject, "Why Refrigeration is Necessary," and the other a slogan contest on the subject, "The Benefits of Refrigeration." Cash prizes were offered and the winners were announced at the meeting. This is the third of a series of meetings held by this Women's Committee under the title of "Short Course in Gas and Electrical Equipment." Miss Edna J. Decker is chairman of the committee.

* * *

The June number *Cipsco News,* published by the Central Illinois Public Service Company, carried interesting pictures depicting the growth of the Women's Committee of Division P of that company. The first picture, dated Jan. 22, 1922, showed nine girls in this group and the later picture, taken in May, 1929, was a larger group of twenty-five girls. Miss Margaret B. Ward is the chairman.

Miss Emma Winkhart of the Central Illinois Public Service Company has been conducting the weekly meetings of the Girl Scouts, devoting each meeting to a special topic covering subjects on First Aid and Health. The girls in this company assisted in the heating pad campaign held last spring, and sold 2,717 pads or 271 per cent of their quota. In a toaster campaign held the following month, the girls sold 1,500 toasters or 150 per cent of their quota. Four members of the Women's Committee gave a playlet before the Business Women's Club and Directors of the Y. W. C. A. "Evolution of Lighting" was presented to the McDonough Federation of Women's Clubs. Miss Theresa Carroll, general chairman of the Central Illinois Public Service Company Women's Committee, addressed the Business and Professional Women's Club in Mattoon, Ill., on "Women in Business."

* * *

One hundred and twenty-five guests, representing members of the Augusta Girls Community Club, the Augusta Business and Professional Women's Club, the Augusta League of Women Voters and wives of the company employees, were entertained at a special meeting of the Women's Committee of the Central Maine Power Company at Augusta, Me., recently. Senator Dora Pinkham was among the speakers and Miss Bradford of the Postum Company demonstrated the use of several electrical appliances and prepared a complete meal during the course of her talk.

* * *

Approximately one hundred and twenty visitors, which included the members of the Women's Club, the Parent - Teachers Association, the Mayor, an attorney and newspaper reporter, as well as the Kentucky Utilities managers, attended the meeting of the Women's Committee of the Madisonville District, Kentucky Utilities Company. Talks were made by the Mayor, members of the Women's Club, Parent-Teachers Association representative, the attorney and members of the Women's Committee.

* * *

The Public Service Company of New Hampshire Women's Committee include in all their meetings visitors from outside organizations such as Business and Professional Women's Club, Parent-Teacher Associations, United Mothers' Club, Delfian Club, 19th Century Club, City Administration, banks and newspapers. Librarians and teachers are also among the invited guests.

Mrs. Josie Leavitt was the winner of the Manchester District and Company prizes of the Public Service Company of New Hampshire in the essay contest on the subject, "What the 1928 Public Relations Program for Employee Meetings Meant to Me."

* * *

The Southwestern Gas and Electric Company Women's Committee at Marshall, Shreveport and Texarkana Divisions, also invite a number of representatives of outside organizations to all of their meetings. These organizations include chambers of commerce, newspapers, manufacturers, women's clubs, Business and Professional Women's Club and Parent-Teacher Associations. The Commissioner of Public Utilities, County Demonstration Agents and the Mayor of the city have also been among those invited to attend.

Miss Elizabeth Thomas of this company was awarded cash prize for the best essay on the subject, "What the 1928 Employee Educational Meetings Meant to Me."

Both district and company prizes in the West Texas Utilities Company Public Relations essay contest for employees were won by Mrs. Nona K. Bagwell of the Haskell office.

* * *

Laundry schools have been held throughout Twin State Gas and Electric Company properties of Vermont, to which were invited women of the community. Responses have been very gratifying. Talks included addresses on the Women's Committee and complete instruction on laundering.

* * *

Miss Knobel of the Wisconsin Power and Light Company conducted a cooking school at the Portage office for the office girls and wives of employees, demonstrating the gas range and refrigerator. She also showed the women how to use the toaster and waffle iron.

* * *

According to *The Round Table,* published by the Women's Committee, Kansas Section, the girls of the Independence district, Kansas Gas and Electric Company, recently enjoyed a week-end camping trip at the Neosho Plant with District Manager Murrow and Mrs. Murrow as hosts. Mr. Murrow and the engineers explained the intricate operation of the plant to the girls, thus providing an instructive as well as entertaining week-end party.

* * *

Announcement is made in *Electro Topics,* published by employees of The Tennessee Electric Power Company, at Chattanooga, of the election of Miss Lena Grimm as chairman of the Women's Committee of that company. Miss Grimm served last year as vice-chairman and the year preceding as secretary. She represented the company in the State public speaking contest conducted by the Tennessee Women's Committee of which Miss Dorothy Murhpy is chairman.

* * *

"The Distaff Side" is the title of the new department for women in "Power News," published in Indianapolis by and for the employees of the Interstate Public Service Company and the operating subsidiaries of the Central Indiana Power Company. Miss Marie Tudor, director of the Home Service Department of these companies, is the editor of this page.

* * *

A recent issue of the *Puget Sound Electric Journal* carries a picture of Miss Dorothy Chase of the Western District, Puget Sound Power and Light Company, who has been elected president of the Women's Business and Professional Club of Bremerton, Washington. A number of Puget Sound Power and Light Company girls attended the convention of the Business and Professional Club held in Seattle.

The Puget Sound Women's Committee recently arranged the program of a meeting of the Business and Professional Club at Seattle. Mr. J. C. Scott gave an illustrated talk on "Electricity on the Farm," musical selections were given by company artists and electrically frozen desserts with electrically baked cakes provided the refreshments.

* * *

The Women's Committee of the Wisconsin Power and Light Company, Madison, Wis., has recently organized a First Aid Drill Team as have also the Northern States Power Company Committees at Red Wing, Minn., and La-Crosse, Wis.

The First Aid Team of the Northern States Power Company at Eau Claire, Wis., gave their demonstrations before the Kiwanis Club, Red Wing, Minn., at their luncheon on July 11. The total audience was sixty, including two doctors and the physical director of the Y. M. C. A. The girls received many compliments on their work.

The judges in the state-wide program contest, which was conducted by the Women's Committee of the Wisconsin Utilities Association over a period of a year, have had one meeting and adjourned without having arrived at a decision. They found that all of the committees have conducted such high grade programs, attended so regularly and reported so fully that it is difficult to grade them. They will meet again shortly to go over the material and arrive at a definite decision.

Women's committee activities have been carried on in the Wisconsin Division of the Northern States Power Company for five years—there being three committees. June 22 marked their first all-division conference which was held at Eau Claire, Wis. Eighty-two women employees registered. District managers and their wives attended. Miss Helen Welsh, president of the local committee, presided. Mr. G. V. Rork, division manager, gave the address of welcome and a program followed in which ten members from the various districts participated. Papers were read and a demonstration was given by the First Aid Drill Team. There was one outside speaker. During the latter part of the afternoon the women were conducted in small groups through the Wissota Hydro Plant and the New Hydro Plant at Chippewa Falls, Wis. They were entertained in the evening at a dancing party given at Lake Hallie Park, which is company property.

MAGAZINE ARTICLES

Below is a list of articles which appeared in various magazines recently that are especially interesting to Women's Committee members:

Ladies' Home Journal—August
This Age of Refrigeration—Gove Hambidge.
September
A New Food Vision—Gove Hambidge
Music and Modern Magic—Walter Damrosch

Good Housekeeping—August
Your Laundry—Eva Wilson
Another Chapter on Floors—Helen W. Kendall and Curtis C. Wyrtzen.
September
A Refrigerator That Meets Your Needs—Katharine A. Fisher
How Hot Should Your Iron Be?—Helen W. Kendall and Curtis C. Wyrtzen
Which Cleaner Shall I Buy?—T. L. Henderson

McCall's Magazine—September
Wiring the House Old or New—Anne Pierce

Woman's Home Companion—August
Telling the World—Hazel Rawson Cades.

Pictorial Review—August
Modern Laundry Equipment—Margery Beem

Modern Priscilla—August
New Acquaintances in Cooking Equipment—Margaret H. Hartnett. September
Labor Saving Laundry Methods

Better Homes and Gardens—August
Warmer Meals from Cooler Kitchens—Katherine Goeppinger

People's Home Journal—September
Cleaning a la Mode—Margaret Palmer

Delineator—September
We Develop New Ways of Washing
Refrigeration the Year Round

RELATED and other ORGANIZATIONS

Berlin Chosen for World Power Conference

SIX years after the notable World Power Conference held at London in 1924, the second plenary meeting of this international body will take place in Berlin from June 16 to June 25, 1930. Berlin was selected as the meeting place by unanimous resolution of the 47 member nations of the conference, and the meeting will bring together many of the most prominent authorities on power and fuel from all over the world. Dr. Gerhard Dehne is acting for the managing organization at Berlin. O. C. Merrill of Washington is general chairman of the American committee, and all communications relating to the conference should be addressed to him. All papers submitted from the United States must go through the American committee, which will forward them to Berlin, the latest date for their receipt there being Nov. 1 of this year.

Copious information and counsel has been printed and is available for those thinking of preparing papers. This information emphasizes the point that the conference of 1930 will deal principally with the distribution and utilization of power and that economic considerations rather than technical and engineering questions will be emphasized, technical questions being of interest only in so far as they concern the most recent progress.

It is announced that, "In the wide field of electrical generation, an international discussion would be of the greatest interest regarding the considerations that are at present decisive in the questions of selection and subdivision of generating plant in large central stations. In connection with this the problem of the storage of electrical energy and provision for peak loads deserves special consideration." The many electrical topics that have been suggested fall under the three divisions of generation, distribution and utilization.

"The subject of water power," the statement says, "was dealt with fairly exhaustively at the section meetings at Basle in 1926 and Barcelona in 1929. It will thus be advisable to limit the choice of subjects at the plenary conference in 1930 in order to avoid repetition and to direct attention particularly to recent progress and advances. Nevertheless, the utilization of water power in general plays such an important part in most countries in the whole question of power economics that the advances made in various directions should be set out systematically. It will be of advantage to class these advances under the following principal headings: Developments in regard to economy; extension and utilization of water power; progress in matters of water-power storage; new developments in the construction of water turbines and pumps, and experience and progress in matters of water economy."

Conference at Camp Cooperation

REPRESENTATIVES of 43 local electrical leagues held their eighth annual conference Aug. 2-6 at Camp Cooperation, Association Island, Henderson Harbor, N. Y., with 200 in attendance. R. Bourke Corcoran of Chicago, chairman of the League Council, presided, sessions continuing from Friday until Tuesday.

The program embraced a broad discussion of league operation and financing and, in addition, the following addresses: "The Place of the National Electrical Code in Our Business Development Work," A. Penn Denton, engineer National Electrical Manufacturers' Association: "Franklin Red Seal—A National Plan to Increase Lighting Business," Arthur E. Allen, vice-president and general manager Westinghouse Lamp Company; "How to Sell New Lighting Equipment to Old Homes," Charles L. Benjamin, managing director Artistic Lighting Equipment Association; "Building and Maintaining Satisfactory Relations with Architects," Leroy E. Kern, technical secretary the American Institute of Architects.

R. Bourke Corcoran was reelected chairman of the League Council and D. C. Burdsell vice-chairman.

Conference for Rural Service Men

THE third annual Conference for Rural Service Men of electric light and power companies will be held October 10-12, inclusive, at the Agricultural Experiment Station of Purdue University, Lafayette, Ind. The tentative program includes the following addresses:

"What Progress Are We Making in Farm Electrification?" Eugene Holcomb, Jackson, Mich., Chairman, Rural Service Committee, National Electric Light Association; "The Relation of the County Agent to Rural Electrification and Utility Rural Service Man," Director or Assistant Director of Agricultural Extension Work, Purdue University; "How Electric Current Pays Its Way on My Farm," Arthur Shugart, Marion, Ind.; "Operating the Thresher or Husker-Shredder with an Electric Motor," R. H. Wileman, Agricultural Engineering; "Electric Water Heaters on the Ohio Experimental Line," Prof. G. W. McCuen or I. P. Blauser, Ohio State University; "Shall We Grind or Shred Corn Stover?" Prof. J. H. Hilton, Dairy Department; "Report on New Electric Water Heaters or Use of Lights in Brooding Chicks," Prof. C. W. Carrick, Poultry Department.

"How Demonstrations and Demonstration Farms Aid in Rural Electric Development," Richard Boonstra, Public Service Co. of Northern Illinois; "How to Proceed to Analyze Potential Electric Load on Farms," Prof. E. W. Lehmann, University of Illinois; "Planning Adequate Farm Electric Service Through Proper Wiring," Douglas Dow, Detroit Edison Co.; "What Types of Electric Brooders Can We Recommend?" Prof F. D. Brooks, Poultry Department; "Shall the Dairyman Use Walk-In or Tank Type Storage?" Prof. E. H. Parfitt, Dairy Dept.; "How Fine Shall We Grind Oats for Hogs and Steers?" Prof. F. G. King, Animal Husbandry; Discussion of New and Unusual Uses of Electricity on the Farm; and an evening banquet to be featured with addresses by Fred C. Purnell and Arthur Huntington.

The program for the morning of Oct. 12 will be arranged by the rural service committee on merchandising.

Tentative Date for C. E. A. Convention

IN order to allow other geographic divisions to choose dates for their conventions which will not conflict, the Fortieth Annual Convention of the Canadian Electrical Association has been tentatively set for June 10-14, 1930, at Murray Bay, Quebec. This date is subject to a slight alteration, dependent upon the C. E. A. being able to close a contract for the exclusive use of the hotel for these dates.

Official Ticket Selected for S.E.D. Directors

BELOW is the official ticket of the nominating committees for directors of the Society for Electrical Development. The election will be held at the annual meeting on Sept. 13, in the society's offices, New York.

To represent central-station group: One year, M. S. Sloan, M. E. Sampsell, Paul S. Clapp; three years, Charles L. Edgar. To represent manufacturer group: One year, H. B. Crouse, A. E. Waller, W. E. Sprackling; three years, Gerard Swope. To represent wholesaler group: One year, G. E. Cullinan, E. Donald Tolles, John L. Buchanan; three years, Edwin M. Keatley. To represent contractor-dealer group: One year, C. L. Chamblin, L. W. Davis, S. C. Blumenthal; three years, C. M. Beltzhoover. To represent "at-large" group: One year, F. D. Gill; three years, James H. McGraw. To represent local electrical leagues: One year, R. B. Corcoran, D. C. Birdsell, J. E. North, J. H. Van Aernam; three years, H. H. Courtright.

WHAT OCCURRED LAST MONTH

Colorado River Project

The Interstate Commerce Commission has granted the Los Angeles and Salt Lake Railroad permission to construct a branch line in Clark County, Nev., to a point south of Las Vegas, from which the road would be continued by the government to the dam site.

* * *

Congressman Taylor of Colorado, maintaining that the Boulder Dam act, despite its proclamation by the President, will not be effective until after the contracts for power have been signed, is protesting vigorously against any action by the Federal Power Commission on pending applications, on the ground that to grant any of them would militate against the interests of the Upper Basin states.

* * *

Consolidations, etc.

The Public Service Commission of New York has granted to the Western New York Gas & Electric Corporation authority to transfer its franchises, works and system to the New York Electric Corporation.

* * *

The Illinois Commerce Commission has authorized the purchase of the Henderson County Public Service Company by the Illinois Light & Power Corporation.

* * *

The Middle West Utilities Company has completed the purchase of the United Public Service Company of Chicago, a fifty-million-dollar corporation, operating utilities in Indiana, Ohio, Kentucky, North Dakota and South Dakota.

* * *

Acquisition by the Northwestern Public Service Company of the North Dakota Power & Light Company at Bismarck, N. D., the Knife River Coal Mining Company at Beulah, N. D., and the Northern Power & Light Company at Mobridge, S. D., has been announced. The acquired light and power companies, which serve 84 towns and cities in North and South Dakota, will continue under their present corporate names for the time being.

* * *

Authority to merge several Insull-owned power companies in Vermont, to be operated under the name of the Central Vermont Public Service Corporation, was handed down Aug. 18 by the Vermont Public Service Commission. The companies which figure in consolidation are the Vermont Hydro-Electric Company, Rutland Railway Light & Power Co., Pittsford Water Co., Public Service Corporation of Vermont, Middlebury Electric Co., and the Bradford Electric Light Co.

* * *

The Wisconsin Power & Light Company has bought the Northwestern Light & Power Company of Mayville, Wis.

* * *

Customer-Ownership

Sales of electric light and power company stock to customers, employees and other local parties in May consisted of 33,800 transactions involving 342,450 shares, valued at $15,588,000, according to reports received by the *Electrical World*. This is a decided increase over April and several preceding months. The average sale was $460 per transaction.

* * *

Earnings of Public Utilities

Gross earnings of public utility enterprises in June, 1929, exclusive of telephone and telegraph companies, as reported to the Department of Commerce by 95 companies or systems operating gas, electric light, heat, power, traction and water services, were $183,000,000, as compared with $189,750,000 in May, 1929, and $178,696,556 in June, 1928.

* * *

Federal Trade Commission's Investigation

The Federal Trade Commission has announced that, in accordance with a stipuation entered into by both parties and by Judge Knox of the United States District Court for the Southern District of New York, no further court action will be taken in the case of the Commission against the Electric Bond & Share Company before Sept. 16. The stipuation provides that each party shall have until that date to decide what course it will pursue. The Commission's announcement says that it has not yet decided what will be its own course.

* * *

Foreign

Private ownership and operation of public utilities is advocated as a matter of policy in the Dawes Commission's report recommending changes in the financial arrangements of the government of San Domingo. The 1929 deficit for postal telegraph, telephone and radio service was estimated at $312,762. The Commission said in submitting the report: "It is the experience of the world that public utilities are more efficiently administered and more economically operated by private interests than by government operation, and the Commission is convinced that if these public utilities can be sold at a reasonable figure, a very large saving would arrive to the government."

* * *

Per capita consumption of energy in Belgium reached 320 kw-hr. in 1928, according to the *Electrical World*. This figure compares favorably with Germany, 250 kw.hr.; France, 248 kw-hr.; England, 200 kw-hr.; Holland, 134 kw-hr.; Switzerland leads all Europe with 700 kw-hr.

* * *

Franchise Not Needed

It is stated that the recently organized Industrial Power Corporation of Chicago will require no franchise because the stockyards area which it will serve is privately owned, as is the right-of-way upon which the lines and conduits will be laid.

* * *

Government Operation

Edward N. Hurley, war-time chairman of the United States Shipping Board, speaking before the University Institute of Public Affairs at Charlottesville, Va., on Aug. 12, said $500,000,000 would have been saved by the Government if war-time shipping could have been built by private enterprise.

* * *

Hydro-Electric

The State Corporation Commission of Virginia has dismissed the application of the Virginia Public Service Company to construct a dam across North River in Goshen Pass on the ground that the streams involved in the application are not "waters of the state." The proposed dam had been opposed by the Garden Clubs of Virginia.

* * *

The *Toronto Mail and Empire* in a dispatch from Victoria, B. C., stated that the greatest water power development program ever undertaken in western Canada is now facing British Columbia, with half a dozen important utility corporations involved in petitions for hydro-electric concessions. The applications stipulate for the harnessing of 800,000 horsepower additional to that already being utilized.

* * *

The Calgary, Alberta, Power Company expects to have in service within three months its plant being built on the Ghost River, which will develop approximately 36,000 horsepower.

* * *

According to the Charlotte (N. C.) *Observer* of Aug. 8, a "New Niagara" is planned in the mountains of North Carolina and Tennessee by the Aluminum Company of America, which will, it is reported, spend $125,000,000 in development of hydro-electric projects. Eight separate dams, the paper says, are planned.

* * *

The city of Seattle, in two applications filed at the Washington State Hydraulics office, seeks the enlargement of its Skagit Gorge and Diablo Canyon Power projects on the Skagit River so that these two units will have an increased output of 67,057 electrical horsepower.

* * *

The first Lower Nisqually River power development has been authorized by the state hydraulics supervisor of Washington, who has issued permits to the Pacific Development Company of Olympia, which contemplates the construction of a plant to cost $1,500,000.

* * *

On July 26, opponents of the proposed hydro-electric development at Cumberland Falls filed with the Federal Power Commission a brief in support of their viewpoint. The brief challenges the validity of the contentions upon which the counsel of the Executive Secretary of the Commission had given an opinion that matters such as scenic beauty could not legally be considered by the Commission in acting upon power project applications.

* * *

The case of the Cumberland Hydro-Electric Power Company involving an application for the construction of a water power project at Cumberland Falls, Ky., was submitted to the Federal Power Commission Aug. 1. Action was deferred to a later meeting.

* * *

On Aug. 2 a brief urging that the application of the Cumberland company to build and operate a power plant at Cumberland Falls be granted, was filed with the Federal Power Commission by Stephens & Steely, of Louisville, Ky., counsel for counties and people of upper Cumberland Valley and the State of Kentucky. The brief set forth the advantages that would accrue to the adjacent counties.

* * *

On Aug. 7 the filing of a brief with the Federal Power Commission in opposition to the granting of an application to construct the hydro-electric project at Cumberland Falls, was announced by the Commission. The brief was filed by Traube, Doolan, Helm and Helm, and John C. Doolan, counsel for interests opposing construction of the project. The brief took issue with the conclusions set forth recently by Col. L. W. Call, chief counsel to the executive secretary of the Commission.

* * *

Opposition to the application of the Cumberland Hydro-Electric Company to develop the power resources of Cumberland Falls on the Cumberland River, in Kentucky, was expressed in a brief filed, Aug. 16, with the Federal Power Commission by the Attorney General of Kentucky, J. W. Cammack. The Attorney General challenges the legality of the proposed contract between the Cumberland River Power Company, a subsidiary of the applicant before the Commission, with the Kentucky Park Commission.

* * *

The Federal Power Commission, in calculating the cost of construction on Federally-licensed power projects, is limited by the Water Power Act to actual expenditures for construction, it is stated in an opinion rendered by the solicitor of the Commission, Charles A. Russell. Items for engineering, supervision, management, financing and development must not be included in capital expenditures, according to the opinion set forth in a memorandum to William V. King, chief accountant to the Commission.

* * *

Recommendation that a preliminary permit be granted the Potomac River Corporation of Wilmington, Del., for ultimate development of a hydro-electric power project at Great Falls, Md.-Va., on the Potomac River, was made to the Federal Power Commission by Major Gen. Edgar Jadwin, just before he retired as Chief of Army Engineers, the Commission announced Aug. 12.

* * *

Development of the Great Falls area on the Potomac River in Maryland and Virginia for park purposes, instead of for both park and hydro-electric development, was recommended by the National Park and Planning Commission in its majority report to the Federal Power Commission made public Aug. 17. The report was submitted to the Power Commission, accompanied by the dissenting minority report of Maj. Gen. Edgar Jadwin, former Chief of Army Engineers, in his capacity as chairman of the Commission.

* * *

The Missouri Public Service Commission has granted the application of the Union Electric Light & Power Company of St. Louis, Mo., for authority to purchase the site for its proposed $30,000,000 hydro-electric power dam and plant on the Osage River near Bagnell, Mo.

* * *

Senator R. B. Howell of Nebraska has announced he will seek an appropriation of $10,000,000 for a publicly owned power plant on the Platte River in Nebraska, probably at the next regular session of Congress.

* * *

The Virginia-Carolina Power Company on Aug. 17 filed with the Federal Power Commission an application for a license to develop hydro-electric power resources of the Roanoke River in Northampton and Halifax counties, North Carolina.

* * *

In the first half of the present year, new hydro-electric developments have added 200,000 horsepower to the power resources of the Dominion of Canada, according to the mid-year review of the Water Powers Branch of the Dominion Government, while works under way will add 2,000,000 horsepower to the grand total.

* * *

An ultimate expenditure of approximately $20,000,000 is foreshadowed by the preliminary permit granted by the Federal Power Commission to the Washington Electric Company of Seattle, a Puget Sound Power & Light Company subsidiary, for its Rock Island power project on the Columbia River at a site near Wenatchee, Wash.

* * *

Mine-Mouth Plants

The state authorities of Pennsylvania are considering the applications of the Philadelphia & Reading Coal & Iron Company for charters for 33 electric public utility companies to operate at mine-mouths in an equal number of communities throughout a section of the state.

* * *

Municipal Operation

A comprehensive plan for the development of a municipal power system for Aberdeen, Wash., is indicated in a recent announcement by city officials. The city will buy the power and resell to consumers, four sources being under consideration. All plans call also for construction of a hydro-electric plant on the Upper Wynoochee River. Officials state that the first unit of a projected five-million-dollar plant can be built well within the limit of $2,000,000 set in a bond issue favored by city voters several years ago.

* * *

Power Survey

Prof. V. L. Hollister, of the University of Nebraska engineering faculty, has been engaged by the Middle West Division of the N. E. L. A. to supervise a power survey that a committee has been working for weeks to outline. The survey will cover all power plants in the four states composing the division—Iowa, Kansas, Nebraska, and Missouri.

* * *

Railway Electrification

According to an article in the *Electric Railway Journal,* power for the electrification of the Lackawanna Railroad will be furnished by three New Jersey light and power companies. The power will be supplied through five substations. The project involves 70 miles of route and 160 miles of single track, including main tracks, yards and sidings.

* * *

Rates

Application of the Columbus (Ohio) Railway, Power & Light Company for authority to make a cut of approximately one cent per kw-hr. to domestic and commercial users has been approved by the Utilities Commission, effective Aug. 1.

* * *

Effective from July 1, the Bronx Gas & Electric Company has issued a revised rate for general lighting and power which reduces the number of kilowatt hours in each block, resulting in a marked decrease to the lighting consumer.

* * *

The Municipal Utilities Rate Association of Georgia has been formed by the mayors and other city officials from leading municipalities of the state "to protect the interest of gas and electric consumers."

* * *

Matthew S. Sloan, president of the New York Edison and affiliated electric companies, announced Aug. 15 that the maximum rate of the Yonkers Electric Light & Power Company would be reduced from 10c. a kilowatt hour to 8c., beginning Oct. 1. This will be a 20 per cent cut, making a saving of $200,000 a year for the customers of the company, it is estimated.

* * *

The Maryland Public Service Commission has ordered a $137,500 annual reduction in electric light and power rates on the eastern shore. The order affects the Eastern Shore Public Service Company of Maryland, a subsidiary of the Eastern Shore Public Service Company of Delaware; the Delmarva Power Company, Vienna, Md., and the Consumers Public Service Company, Crisfield.

* * *

Reductions in rates for electric service to customers of the Philadelphia Suburban-Counties Gas & Electric Company, effective Sept. 12, have been announced by William H. Taylor, president. The reductions, approximating $700,000 a year, will apply to residential, commercial lighting and agricultural service on the Eastern, Schuylkill and main line divisions of the company.

* * *

St. Lawrence Project

A memorial has been presented to President Hoover by the Attorneys-General of New York, Ohio, Pennsylvania, Michigan, Minnesota, and Wisconsin, urging him to insist that in developing the Illinois River to complete a deep waterway from Lake Michigan to the Gulf of Mexico, the decision of the United States Supreme Court against transferring water from one watershed to another be strictly observed. The memorial declares that the Sanitary District of Chicago has a plan of improving the Illinois River as a waterway which will cause a much greater diversion than is necessary for sanitation purposes.

* * *

On July 24, at Morrisburgh, Ontario, Governor Roosevelt of New York stated that he would present to the next Legislature definite plans for development of the potential horsepower at International Rapids near Barnhardt Island on the St. Lawrence River. On July 25, Governor Roosevelt completed inspection of the International Rapids section of the St. Lawrence waterway.

* * *

The Institute of Economics of the Brookings Institution of Washington has made public a report holding that the St. Lawrence waterway project is not economically desirable or feasible and estimated the cost of it at $1,000,000,000. The author of the report, nearly 700 pages in length, is Harold G. Moulton, president of the Brookings Institution. Of the billion dollar cost, it is estimated in the report that 614 millions will be assignable to navigation and 385 millions to power development. The annual overhead charges assignable to navigation are calculated at $36,000,000 Extensive analyses of all phases of the project are included in the report.

* * *

A discussion of the proposed St. Lawrence River development was staged Aug. 12 at the Institute of Politics in session at Williamstown College, Williamstown, Mass. Marked differences of opinion were manifest as between Canadian and American speakers, those who represented the United States appearing to share the views recently put forth by investigators for the Brookings Institute at Washington. The United States, it was contended, would have to spend $240,000,000 to help Canada develop 4,000,000 hp. as against 1,000,000 hp. for the United States.

* * *

Taxation

By a vote of 96 to 91, the Georgia House of Representatives voted to table the general sales tax measure and devote its attention to the passage of an income tax bill, which is a companion measure. The bill, which would have imposed a tax of 1 mill on all electricity sold in the state, has thus been temporarily put out of the running. Power companies are not yet in the clear, however, as another bill has been introduced which would place a tax of 5 per cent on all business done by public utility corporations in the state.

* * *

Taxation of Franchises

After a series of hearings, the State Board of Assessment and Equalization of Nebraska has announced that it will tax the various public service companies operating in the state a total of $4,888,812 on their franchises, and in addition has ordered an increase of 10 per cent in their assessed valuation. Only street-car companies are exempted, on the ground that they pay no dividends.

* * *

World Power Conference

The second plenary meeting of the World Power Conference will be held in Berlin from June 16 to June 25, 1930. Berlin was selected by unanimous resolution of the 47 member nations of the conference.

Picked up from

ELECTRICAL NEWS ITEMS

Issued weekly by Department of Public Information, National Electric Light Association, 420 Lexington Avenue, New York City. All or part may be used without further notice and with or without credit being given.

Factors Influencing Railroad Electrification

IN an elaborate report just issued, the Committee on the Electrification of Steam Railroads of the National Electric Light Association, after reviewing the major projects throughout the world, summarizes the immediate factors which influenced various railroad systems to proceed with electrification. These are:

1. The greater economy of electric traction as compared to steam operation in dense traffic territories;
2. The growth of the southern passenger business;
3. The increasing density of both freight and passenger business on our eastern lines and the probability that in the future more rapid movement would be required;
4. The desirability of utilizing the advantages of electric traction in connection with the construction of our new passenger terminals at Philadelphia and Newark;
5. The desirability of building a locomotive that would meet the requirements from the standpoint of weight of train, speed and reliability that we believe will have to be met in this territory in the next twenty years;
6. The probability that the project, if started now, could be completed with a less total expenditure, all matters considered, than if started at a later date.

The Automobile and Electricity

ACCORDING to figures recently published by the National Automobile Chamber of Commerce, the average four cylinder passenger car, operating 11,000 miles per year, uses $144 worth of gasoline and $24 worth of oil and grease per year, a total cost of $168 for fuel and lubricants. This is five and one half times what the average family pays for electric service.

The average six cylinder passenger car used $167 worth of gasoline and $22 worth of oil and grease, or a total of $189. This is more than six times the average annual bill for domestic electricity.

Both the automobile and electric service in the home have passed out of the class of luxuries and are now considered as everyday necessities. Both give enormous values for the consumer's dollar. The automobile has released man from the slavery of fixed transportation schedules, while electric service has contributed immeasurably to the comfort of his home and to the elimination of the old time drudgery of innumerable household tasks. The cost of the latter however, is less than one per cent of the average family budget.

Lighted Airways

ADDITIONAL thousands of miles of 24-hour airways—routes so marked that flying is no longer a dawn-to-dusk enterprise—are to be put in service by the United States Department of Commerce, which is to install 400 additional airway beacons at intervals of ten miles each along the new night routes.

The 24-in. beacons, each of 2,000,000 candlepower, rotate six times per minute. Each tower is equipped with two course lights in addition to the beacon, the lights pointing in the direction of the airway and flashing in code to indicate the number of the beacon along its particular route. If there is no landing field at the beacon, the course lights have red lenses; green lenses are reserved for use at airports and intermediate landing fields.

A National Policy on Water Power

IN a report on the progress of water power development in 1928 just issued the Water Power Development Committee of the National Electric Light Association sets forth concisely the views of the power industry with respect to a national policy on water power. Discussing the outstanding principles which should form the basis for such a policy, the committee says:

"Water power resources should be developed to the fullest extent and in the shortest time possible under the economic conditions that prevail. The greatest benefit from the large water-power developments of the country, such as the St. Lawrence, Tennessee, Columbia, etc., will be the growth and general prosperity of the adjacent territory which will be due to the industrial growth that naturally follows these developments.

"In general, the greatest utilization can be secured for water-power developments when they are part of large utility systems. This is specially true if there are other uses of the water, such as irrigation, navigation and flood control, all of which result in variable rates of output whose inequalities can usually be tolerated in or absorbed by a large interconnected system of steam and water power plants.

"Special charges or taxes assessed against water power development by Federal or State governments limit the extent to which water power can be used to foster industrial development; consequently such charges should not be imposed.

"Regulation by public agency should be provided (as it now is in practically every State) to secure proper service at fair rates to all consumers.

"The Federal Water Power Act in its present form can be administered so as to promote the development of all water power for which a market exists, and it provides ample safeguards for the public interest. Water powers for which no market exists should be withheld from development until economic conditions warrant bringing them into use.

"The tendency to exempt from the jurisdiction of the Federal Water Power Commission any projects over which the Federal Government has jurisdiction is unsound and leads to undesirable delay and inefficiency in the development of feasible water powers."

Trackless Trolleys in Salt Lake City

AUTOMOBILES will not longer be able to get out in the tracks and hold up the trolleys on the Ninth East Street line in Salt Lake City. Trolleys on that route hereafter will be trackless, on rubber tires, and able to maneuver in traffic.

The Utah Light and Traction Company, which already has some trolley buses in service, has been given permission by the city commission and the state public utilities commission to remove the tracks from the Ninth East Street route, pave over the old right-of-way, and supply a considerably speeded service with trolley buses.

The increased acceleration afforded by a new type of control, the greatly decreased weight of the unit, and the ability to maneuver eight or nine feet from the side of the overhead trolley in passing obstructions or reaching the curb, are among the factors contributing to the faster schedule speeds which will be obtained with the new trolley buses.

THE REVIEWING STAND

Suggestion Systems

Serial report, Accident Prevention Committee, Engineering National Section, N. E. L. A. Publication No. 289-112, 28pp., 23 illustrations, 5 tables. Price, 40 cents; to members, 25 cents.

INQUIRY among those who have had to do with a suggestion system has developed the fact that there is no medium better than the suggestion system to bring accident hazards to light, as well as valuable items along many other lines. Moreover, it is the opinion of the Accident Prevention Committee that no channel has as yet been devised equal to it for obtaining the opinions of a large group of employees, and obtaining their cumulative experience which is far better than an equal amount of theorizing.

This report defines a suggestion system as an orderly method for encouraging, receiving and rewarding ideas of employees relative to the business of the employing firms or corporations. Interesting statistics gleaned from studies of reports by two leading universities are set forth in the report. Details of a suggestion system are analyzed and a bibliography is included.

A large portion of the report is devoted to statements of operating companies' experiences with and method of operation of a suggestion system. Various forms used by half a dozen different companies are illustrated.—*E. S. B.*

Uniform Records of Electrical Operation of Power Systems

Serial report, Electrical Apparatus Committee, Engineering National Section, N. E. L. A. Publication No. 289-52 16pp., 14 tables. Price, 30 cents; to members, 20 cents.

THIS report describes typical forms for recording, analyzing and summarizing, on a uniform basis, the electrical operation of power systems under abnormal conditions. In setting forth the purpose of the report, the committee points out that records of interruptions, equipment troubles, operating mistakes, relay performances, etc., have progressed to the point where the practice of several companies may be correlated and set down for the information and suggestive guidance of the industry. This correlation is a stage between description and standardization. There is now sufficient uniformity of definition, methods, and uses as to permit coordination without attempting a standardization that might, at this time, be restrictive to progress, as well as limited in acceptance.

The report deals primarily with the accurate records of system performance under abnormal conditions, including records of interruption to customers.

It is understood that those adopting these records may take such liberties with them as are necessary to fit their respective organizations, but that the essential results will be kept on a uniform basis.

The report has been prepared by the Electrical Apparatus Committee of the Southeastern Division, N. E. L. A., assisted by the Relay Subcommittee of the Protective Devices Committee, A. I. E. E., and by the Operating Practices Subcommittee of the Electrical Apparatus Committee, Engineering National Section, N. E. L. A.—*E. S. B.*

Patrol and Inspection of Transmission Lines

Serial report, Overhead Systems Committee, Engineering National Section, N. E. L. A. Publication No. 289-42, 12pp., 6 illustrations, 5 tables. Price, 25 cents; to members, 15 cents.

THAT periodic patrolling of transmission lines is worthwhile from the standpoint of continuity of service, increased revenue and public safety, is indicated by the information compiled in this report by the Overhead Systems Committee.

Based on a résumé of 105 replies to a questionnaire sent to member companies in this country and Canada the report sets forth the detailed information obtained and analyzes the returns by (a) Geographic Divisions of the Association, (b) Transmission Systems, (c) Time Interval Between Patrolling, (d) Voltages, (e) Method of Transportation, and (f) Miles in the Different Systems that Follow Private Rights-of-ways, Highways and Streets.

Extracts from letters written by two companies in reply to the questionnaire, which are of more than ordinary interest, are included. The report also reproduces specimen field report forms used by several of the companies.—*E. S. B.*

Boilers, Superheaters and Economizers

Serial report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-75, 78pp., 12 illustrations, 8 tables. Price, $1.15; to members, 75 cents.

THE variety of boiler plant equipment now available and the rapid succession of new developments constitute at times a source of confusion, both to designing and operating engineers. This report reviews and evaluates some of the most recent developments and attempts to relate important trends of design where possible to certain definite objectives.

The use of increasingly high steam temperatures in central station practice makes the survey of operating practices outlined in the report most valuable. Definite information is given relative to the temperatures in 81 representative stations. The operating results of these stations are presented graphically and in tabulated form. The remainder of the report consists of miscellaneous statements on the following subjects: Circulation in Water-Cooled Furnace Wall Circuits, Steam Generating Capacity of the Water Tube Boiler, Thermal Stresses, Embrittlement in Steam Boilers, Structural Stability of the Steam Boiler, Operation of High-Pressure Cross Cracking Stills, and a statement by the American Uniform Boiler-Law Society.

Nineteen operating companies describe various operating experiences and manufacturers' statements are presented on the following equipment: Boilers and Water Walls, Superheaters, Economizers, Soot Blowers, Baffling Feed Water Regulators, Water Columns and Water Gages, Steam Purifiers, and Valves. A comprehensive bibliography concludes the report.—*E. S. B.*

Promotional Rates

Serial report, Promotional Rates Committee, Commercial National Section, N. E. L. A. Publication No. 289-93, 12pp., 2 illustrations. Price, 15 cents; to members, 10 cents.

THIS report emphasizes the desirability of more standardization of form in rates and reviews the various types of rates now in use, including Straight Line Meter Rate, Step Meter Rate, Block Meter Rate, Flat Demand Rate, Service Charge Rate, Wright Demand Rate, Block Hopkinson Demand Rate, Three Charge or "Doherty" Rate, Floor Area Rate, and Room Rate Charge.

Report of the Committee on Public Utility Rates, 1927, National Association of Railroad and Utilities Commissioners, is quoted in part and concludes the report.—*E. S. B.*

Educational Committee

Serial report of the Educational Committee, N. E. L. A. Publication No. 289-122, 20pp., 11 illustrations. Price, 30 cents; to members, 20 cents.

A REVIEW of the Educational Committee's work for the year is given in this report along with a brief description and outline of the courses offered by this committee. A sample page from each of the various courses is illustrated.

The review of the year's work shows

that a total of 3379 of the various courses now offered by the Committee were distributed, as against 2197 for the previous year, an increase of 54 per cent. It is pointed out that this increase was due largely to the meter courses conducted by the Engineering National Section. No doubt a much larger distribution could be obtained if all member companies were familiar with the advantages of using these courses and would formulate some definite plan of employee education as already adopted by a large number of member companies.—*E. S. B.*

The Electric Farm Equipment Market

Serial report, Merchandise Sales Committee, Commercial National Section, N. E. L. A. Publication No. 289-92, 12pp., 1 illustration, 6 tables. Price, 25 cents; to members, 15 cents.

THE merchandising problem involved in the question, "How to build the load on the farm?" is thoroughly analyzed in this report of the Merchandise Sales Committee. It is pointed out that since farm electrification is a new development in the electrical utility business, it calls for specialized attention, and that specialized men are required to handle it. Among the fundamental recommendations made in this report is that rural electrification activity be divided into two parts, namely, (1) rural service development or new business development, (2) actual selling of farm electric equipment.

Sales repirements, what, when and how to sell, and the analysis of available data are subjects dealt with in the report. A large amount of statistical information is available which, when digested, analyzed and summarized, will yield important information for the merchandising manager and salesmen. A method of doing this is demonstrated, a compilation of available data made by the Rural Electric Service Department and the Rates Statistical Department of the Northern States Power Company, Minneapolis, Minn., being analyzed in detail for two of the thirteen divisions of the company.—*E. S. B.*

Automatic Train Control Installations and Description of the Code System

Serial report, Inductive Coordination Committee, Engineering National Section, N. E. L. A. Publication No. 289-95, 17pp., 3 illustrations. Price, 30 cents; to members, 20 cents.

CONSIDERABLE progress has been made in the development of automatic train control during the past two years. The most outstanding development of interest from an inductive coordination standpoint, the installation of the Code System of Automatic Train Control, is described in this Serial Report prepared by the Train Control Subcommittee. The operation of this system is based upon a fundamental frequency current in the rails interrupted at various regular intervals to produce the desired signals in the locomotive cab by induction from the current in the rails.

In addition, the report shows the present status of the installation of automatic train control systems.—*E. S. B.*

DC Substation Design Practice

Serial report, Electrical Apparatus Committee, Engineering National Section, N. E. L. A. Publication No. 289-82, 90pp., 157 illustrations, 2 tables. Price, $1.50; to members, $1.00.

THIS report presents in a condensed form the principal features of design of twenty-seven direct-current substations supplying Edison or railway loads. The data are presented along the general lines found useful in two preceding reports on alternating-current substation design, "A. C. Substation Design Practice," Publication No. 25-44, issued in July, 1925, and "A. C. Substation Design Practice—1927," Publication No. 278-39, issued in April, 1928.

The report is divided into four sections: (1) Automatic Edison Substations, (2) Non-Automatic Edison Substations, (3) Automatic Railway Substations, and (4) Non-Automatic Railway Substations.

Included in the report are simplified plans, cross-sections, single line diagrams, cuts of electrical equipment and building exteriors, and tabulations of substation details.—*E. S. B.*

Training for Better Public Contact

Serial report, Industrial Relations Committee, Public Relations National Section, N. E. L. A. Publication No. 289-108, 8pp. Price, 15 cents; to members, 10 cents.

THIS is the final of a series of four reports of the Industrial Relations Committee, prepared by the Public Contact Training Subcommittee dealing with the subject "Training for Better Public Contact." The preceding report of the series, Publication No. 289-83, outlined the various steps involved in the training program from the time it is proposed until the time it is actually inaugurated, and this report applies the principle of testing or measurement of the personal service which employees give to customers which is entirely consistent with the well-established practice of testing physical equipment, and measuring service and production. The report classifies the methods of measuring results now in use and the application of these methods.

The relation of measurement to the training program is discussed in the latter part of the report, along with recommendations of the Committee.—*E. S. B.*

State and Municipal Regulation of Radio Communication

By Paul M. Siegal and Paul D. P. Spearman of the Legal Division, Federal Radio Commission. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 10 cents.

A PAMPHLET reviewing the present status of State and municipal regulation of radio interference has been issued by the Federal Radio Commission.

General Counsel Bethuel M. Webster, Jr., in his foreword points out that —"In a new field of jurisprudence there is occasion for proceeding thoughtfully and deliberately. This is specially true of radio regulation, which must be based on a recognition of sound engineering as well as legal principles. In response to numerous requests for guidance and information, the members of the Legal Division of the Commission feel an obligation to transmit the fruit of their experience to less experienced persons engaged in the formulation of regulatory measures."

The authors have outlined the proper scope of local regulation as viewed by the Federal Radio Commission and have indicated some of the mistakes, both of policy and of law, which have been innocently incorporated in State statutes and municipal ordinances.

Six Words in an Accountant's Life

(*Continued from page* 592)

treatise, it is not the least important. As a usual thing, when the word personality is used, we think of it in the terms used by "Charlie" Schwab—geniality—pleasantness and good fellowship. Certainly, these are admirable traits for which all gentlemen should strive, but it is not in this sense that I desire to treat the word here. I mean the development of personality in the sense that it is unselfish, that it is willing to be of service to others, that it is willing to spend itself to advance the art and science of the production, distribution and use of electrical energy for public service. A personality that recognizes, as do men of the type of Whitney and Langmuir, that we owe to those who have preceded us in our walks of life, the duty of being part of the changes that are taking place in this workaday world—A personality that will grasp the wisdom, the optimism and the truth contained in the thought of Emerson's "Work Is God's Greatest Gift to Man."

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(Note: (*) **Continues** until successor is ppointed.)

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GREAT LAKES DIVISION

(*Illinois, Indiana, Michigan, Wisconsin*)

President, G. C. Neff, Wisconsin Power & Light Co., Madison, Wis.; *Secretary,* Tom C. Polk, 910 Marquette Bldg., Chicago, Ill.

Illinois State Electric Association

President, E. F. Kelly, Central Illinois Public Service Co., Springfield, Ill.; *Secretary-Treasurer,* George W. Schwaner, 205 Illinois Mine Workers Bldg., Springfield, Ill.

Indiana Electric Light Association

President, C. V. Sorenson, Central Indiana Power Co., Indianapolis, Ind.; *Secretary-Treasurer,* William Stokes, 1548 Consolidated Bldg., Indianapolis, Ind.

Michigan Electric Light Association Section

President, E. L. Edward, Michigan Electric Power Co., Lapeer, Mich.; *Secretary-Treasurer,* Herbert Silvester, The Detroit Edison Co., Ann Arbor, Mich.

Wisconsin Utilities Association

President, G. W. Van Derzee, Milwaukee Electric Railway & Light Co., Milwaukee, Wis.; *Executive Secretary,* John N. Cadby, 502 Brumder Bldg., 105 Wells St., Milwaukee, Wis.

*MIDDLE ATLANTIC DIVISION

(*To Consist of Delaware, District of Columbia, Maryland, Virginia*)

Maryland Utilities Association

President, H. T. Connolly, Washington, Baltimore & Annapolis Electric Railroad Company, Baltimore, Md.; *Secretary,* D. E. Kinnear, United Railways & Electric Company, Baltimore, Md.

Public Utilities Association of Virginia

President, A. W. Higgins, Virginia Public Service Co., Charlottesville, Va.; *Secretary,* A. B. Tunis, 301 East Grace Street, Richmond, Va.

Middle West Division

(Iowa, Kansas, Missouri, Nebraska)

President, A. E. Bettis, Kansas City Power & Light Co., Kansas City, Mo.; *Managing Director,* Thorne Browne, 1527 Sharp Bldg., Lincoln, Neb.

Iowa Section

President, C. S. Macy, Iowa Power & Light Co., Adel, Iowa; *Managing Director,* Joe Carmichael, 310 Crocker Bldg., Des Moines, Iowa.

Kansas Section

President, Frank M. Stone, Kansas Utilities Co., Fort Scott, Kan.; *Secretary,* H. Lee Jones, 820 Kansas Avenue, Topeka, Kan.

Missouri Association of Public Utilities

President, T. J. Strickler, Kansas City Gas Co., Kansas City, Mo.; *Secretary-Treasurer,* F. D. Beardslee, 315 North Twelfth Street, St. Louis, Mo.

Nebraska Section

President, C. W. Amidon, Central Power Co., Grand Island, Neb.; *Managing Director,* Thorne Browne, 1527 Sharp Bldg., Lincoln, Neb.

New England Division

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)

President, C. H. Hodskinson, The Edison Electric Illuminating Co., Boston, Mass.; *Secretary,* Miss O. A. Bursiel, Room 1113 Statler Bldg., 20 Providence Street, Boston, Mass.

(This Division Has No State Sections)

North Central Division

(Minnesota, North Dakota, South Dakota)

North Central Electric Association

President, Thomas T. Parker, Northwestern Public Service Co., Huron, S. D.; *Secretary,* John W. Lapham, 803-804 Plymouth Bldg., Minneapolis, Minn.

(This Division Has No State Sections)

Northwest Division

(Alaska, Idaho, Montana, Oregon, Utah, Washington)

Northwest Electric Light and Power Association

President, M. L. Hibbard, Idaho Power Co., Boise, Idaho; *Secretary,* Berkeley Snow, Room 1206, Spaulding Bldg., Portland, Ore.

(This Division Has No State Sections)

Pacific Coast Division

(Arizona, California, Hawaii, Nevada, Philippine Islands)

Pacific Coast Electrical Association

President, E. B. Criddle, Southern Sierras Power Co., Riverside, Cal.; *Secretary,* Samuel H. Taylor, Suite 729-730, 447 Sutter Street, San Francisco, Cal.

Arizona Utilities Association

President, M. A. Pooler, Tucson Gas, Electric Light & Power Co., Tucson, Ariz.; *Secretary,* L. C. McCullough, 134 South Central Avenue, Phoenix, Ariz.

Rocky Mountain Division

(Colorado, New Mexico, Wyoming)

President, W. D. Johnston, Mountain States Power Co., Casper, Wyo.; *Secretary,* O. A. Weller, Public Service Co. of Colorado, Denver, Colo.

The Colorado Utilities Association

President, H. S. Robertson, Denver Tramway Corp., Denver, Colo.; *Secretary,* O. A. Weller, Public Service Co. of Colo., Denver, Colo.

New Mexico Utilities Association

President, W. W. Nielsen, New Mexico Power Co., Santa Fe, N. M.; *Secretary-Treasurer,* Bernard L. Wiles, Albuquerque Gas & Electric Co., Albuquerque, N. M.

Wyoming Utilities Association

President, W. D. Johnstone, Mountain States Power Co., Casper, Wyo.; *Secretary,* F. A. Probst, Mountain States Telephone & Telegraph Co., Casper, Wyo.

Southeastern Division

(Alabama, Cuba, Florida, Georgia, North Carolina, South Carolina, Tennessee, Porto Rico)

President, T. H. Tutwiler, Memphis Power & Light Co., Memphis, Tenn.; *Secretary,* C. M. Kilian, 207-8 Bona Allen Bldg., Atlanta, Ga.

Southwestern Division

(Arkansas, Louisiana, Mississippi, Oklahoma, Texas)

President, Fred W. Insull, Public Service Co. of Oklahoma, Tulsa, Okla.; *Secretary,* S. J. Ballinger, San Antonio Public Service Co., San Antonio, Tex.

Arkansas Utilities Association

President, W. E. Bann, Southwestern Gas & Electric Co., Texarkana, Tex.; *Secretary,* R. I. Brown, Arkansas Central Power Co., Little Rock, Ark.

Mississippi Electric League

President, A. H. Jones, Jones-Johnson Co., McComb, Miss.; *Secretary,* A. R. Riddick, A. G. Riddick, Inc., Jackson, Miss.

Oklahoma Utilities Association

President, Thomas R. Weymouth, Oklahoma Natural Gas Corp., Tulsa, Okla.; *Secretary,* Edward F. McKay, 1020 Petroleum Bldg., Oklahoma City, Oyla.

Southwestern Public Service Association

President, Knox Lee, Southwestern Gas & Electric Co., Marshall, Tex.; *Secretary,* E. N. Willis, 403 Slaughter Bldg., Dallas, Tex.

***Note: This Division is in Process of Formation.**

SECTIONS, BUREAUS AND COMMITTEES

Chairmen's names only listed here

Special National Committees

Advertising Committee—(To be determined.)

Charles A. Coffin Prize Committee—M. S. Sloan, The New York Edison Co., New York, N. Y.

Codes and Standards Committee—Irvin W. Day, The Connecticut Light & Power Co., Waterbury, Conn.

Constitution and By-Laws Committee—R. F. Pack, Northern States Power Co., Minneapolis, Minn.

Electrification of Steam Railroads Committee—Britton I. Budd, Public Service Co. of Northern Illinois, Chicago, Ill.

Exhibition Committee—E. W. Goldschmidt, Wagner Electric Corp., New York, N. Y.

Finance Committee—Sidney Z. Mitchell, Electric Bond & Share Co., New York, N. Y.

Lamp Committee—Frank W. Smith, The United Electric Light & Power Co., New York, N. Y.

Prize Awards Committee—W. H. Onken, Jr., *Electrical World,* New York, N. Y.

Public Policy Committee—P. S. Arkwright, Georgia Power Co., Atlanta, Ga.

Rate Research Committee—L. R. Nash, Stone & Webster, Inc., Boston, Mass.

Water Power Development Committee—Paul A. Schoellkopf, The Niagara Falls Power Co., Buffalo, N. Y.

Wiring Policy Committee—J. E. Davidson, Nebraska Power Co., Omaha, Neb.

General National Committees

***Civic Development Committee**—John B. Reynolds, Middle West Utilities Co., Chicago, Ill.

***Educational Committee**—Fred R. Jenkins, Commonwealth Edison Co., Chicago, Ill.

***Insurance Committee**—W. H. Sawyer, Stevens & Wood, Inc., New York, N. Y.

***Membership Committee**—A. Jackson Marshall, National Electric Light Association, New York, N. Y.

***Rural Electric Service Committee**—Eugene Holcomb, Consumers Power Co., Jackson, Mich.

Accounting National Section

***Section's Executive Committee**—W. R. Emerson, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

Budget Committee—B. F. Rodey, The United Electric Light & Power Co., New York, N. Y.

***Classification of Accounts Committee**—H. C. Hasbrouck, C. H. Hopson & Co., New York, N. Y.

***Customers' Records Committee**—E. W. Korsmeyer, Henry L. Doherty & Co., New York, N. Y.

Exhibit Committee—T. A. Wallace, Henry L. Doherty & Co., New York, N. Y.

***Fixed Capital Committee**—Thomas M. Ford, The Philadelphia Electric Co, Philadelphia, Pa.

***General Records Committee**—C. E. McBride, Electric Bond & Share Co, New York, N. Y.

***Purchasing and Storeroom Committee**—K. C. Campbell, The Detroit Edison Co., Detroit, Mich.

***Statistics Committee**—Harry A. Snow, The Detroit Edison Co., Detroit, Mich.

Commercial National Section

***Section's Executive Committee**—Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

***Commercial and Industrial Power and Heating Bureau**—V. M. F. Tallman, Charles H. Tenney & Co., Boston, Mass.

Commercial Cooking Committee—O. Wilhelmy, The Union Gas & Electric Co., Cincinnati, Ohio

General Power Committee—H. C. Thuerk, Associated Gas & Electric System, New York, N. Y.

Industrial Heating Committee—J. L. Faden, The Edison Electric Illuminating Co., Boston, Mass.

***Lighting Bureau**—M. E. Skinner, New York Power & Light Corp., Albany, N. Y.

Commercial and Industrial Lighting Committee W. H. Horton, Jr., West Penn Power Co., Pittsburgh, Pa.

Electrical Advertising Committee—C. J. Eaton, Middle West Utilities Co., Chicago, Ill.

Home Lighting Committee—W. T. Blackwell, Public Service Electric & Gas Co., Newark, N. J.

Street Lighting Committee—R. J. Malcomson, Public Service Co. of Northern Illinois, Chicago, Ill.

***Merchandising Bureau**—Frank D. Pembleton, Public Service Electric & Gas Co., Newark, N. J.

Domestic Electric Range Committee—Frank A. Coupal, Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.

Merchandise Sales Committee—(Not determined).

Refrigeration Committee—(Not determined).

Water Heating Committee—Norman T. Wilcox, Stone & Webster, Inc., Boston, Mass.

***Customer Relations Committee**—H. T. East, Public Service Co. of Northern Illinois, Chicago, Ill.

***Wiring Sales Committee**—A. P. Good, Commonwealth Edison Co., Chicago, Ill.

Engineering National Section

***Section's Executive Committee**—A. D. Bailey, Commonwealth Edison Co., Chicago, Ill.

***Accident Prevention Committee**—C. R. Beardsley, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

***Electrical Apparatus Committee**—R. A. Hentz, The Philadelphia Electric Co., Philadelphia, Pa.

Engineering Administration Committee—W. E. Mitchell, Georgia Power Co., Atlanta, Ga.

Engineering Research Committee—C. F. Hirshfeld, The Detroit Edison Co., Detroit, Mich.

***Hydraulic Power Committee**—Byron E. White, Utica Gas & Electric Co, Utica, N. Y.

***Inductive Coordination Committee**—H. L. Wills, Georgia Power Co, Atlanta, Ga.

***Meter Committee**—A. S. Albright, The Detroit Edison Co, Detroit, Mich.

***Overhead Systems Committee**—Sydney Alling, The Rochester Gas & Electric Corp., Rochester, N. Y.

***Power System Engineering Committee**—L. W. W. Morrow, *Electrical World,* New York, N. Y.

***Prime Movers Committee**—R. D. DeWolf, The Rochester Gas & Electric Corp., Rochester, N. Y.

***Underground Systems Committee**—G. C. McCabe, The Detroit Edison Co., Detroit, Mich.

PUBLIC RELATIONS NATIONAL SECTION

***Section's Executive Committee**—HARRY REID, National Electric Power Co., New York, N. Y.

***Cooperation with Educational Institutions**—JOHN F. GILCHRIST, Commonwealth Edison Co., Chicago, Ill.

***Customer Ownership**—W. H. HODGE, Byllesby Engineering & Management Corp., Chicago, Ill.

***Industrial Relations Committee**—HOMER E. NIESZ, Commonwealth Edison Co., Chicago, Ill.

***Information Bureau Committee**—T. A. KENNEY, Allied Power & Light Corp., New York, N. Y.

Manufacturers' Advertising Committee—(To be determined.)

***Public Speaking Committee**—W. S. VIVIAN, Middle West Utilities Co., Chicago, Ill.

***Relations with Financial Institutions Committee**—CHARLES B. STUART, Halsey Stuart & Co., New York, N. Y.

***Women's Committee**—MISS SARA HARRIS, Utica Gas & Electric Co., Utica, N. Y.

***Provision is made for a representative from each Geographic Division.**

CONVENTIONS AND MEETINGS

Meeting of the Section, Bureaus and Committees of the National Electric Light Association are shown in roman type; those of other associations in italics

1929

September

2–4 Colorado Utilities Association, Glenwood Springs, Colo.

2–4 Rocky Mountain Geographic Division Hotel Colorado, Glenwood Springs, Colo.

4–6 Pennsylvania Electric Association, Bedford Springs Hotel, Bedford Springs, Pa.

9–12 New England Geographic Division, Hotel Griswold, New London, Conn.

9–13 *American Society for Steel Treating, Cleveland, Ohio.*

9–14—*Association of Edison Illuminating Companies, Quebec, Canada.*

18 Rural Electric Service Committee, Room 1740, Edison Bldg., Chicago, Ill.

19–20 Empire State Gas and Electric Association, Saranac Inn, Saranac Lake, N. Y.

23 9.30 a. m., Women's Committee, Drake Hotel, Chicago, Ill.

23 Executive Committee, Accounting National Section, Palmer House, Chicago, Ill.

23 Customer Ownership Committee, Edison Bldg., Chicago, Ill.

24 Executive Committee, Public Relations National Section, Room 1741, Edison Building, Chicago, Ill.

24 Insurance Committee, Room 1742, Edison Bldg., Chicago, Ill.

24–27 *Illuminating Engineering Society, Bellevue-Stratford Hotel, Philadelphia, Pa.*

25 National Executive Committee, Room 1741, Edison Building, Chicago, Ill.

26–28 Great Lakes Geographic Division, French Lick Springs, Ind.

28–29 Industrial Relations Committee, Rooms 7 and 8, Palmer House, Chicago, Ill.

28–30 *American Electric Railway Association Convention and Exhibit, Municipal Auditorium, Atlantic City, N. J.*

30 *National Safety Council, Stevens Hotel, Chicago, Ill.*

30 Hydraulic Power Committee, William Penn Hotel, Pittsburgh, Pa.

30 Overhead Systems Committee, William Penn Hotel, Pittsburgh, Pa.

30 Power System Engineering Committee, William Penn Hotel, Pittsburgh, Pa.

30 Prime Movers Committee, William Penn Hotel, Pittsburgh, Pa.

October

1 Executive Committee, Engineering National Section, William Penn Hotel, Pittsburgh, Pa.

1 Hydraulic Power Committee, William Penn Hotel, Pittsburgh, Pa.

1 Overhead Systems Committee, William Penn Hotel, Pittsburgh, Pa.

1 Power System Engineering Committee, William Penn Hotel, Pittsburgh, Pa.

1 Prime Movers Committee, William Penn Hotel, Pittsburgh, Pa.

1–2 Accident Prevention Committee, William Penn Hotel, Pittsburgh, Pa.

1–4 *American Electric Railway Association Convention and Exhibit, Atlantic City Auditorium, Atlantic City, N. J.*

1–4 *National Safety Council, Stevens Hotel, Chicago, Ill.*

2–3 Electrical Apparatus Committee, William Penn Hotel, Pittsburgh, Pa.

2–3 Inductive Coordination Committee, William Penn Hotel, Pittsburgh, Pa.

2–3 Meter Committee, William Penn Hotel, Pittsburgh, Pa.

2–3 Underground Systems Committee, William Penn Hotel, Pittsburgh, Pa.

7–10 *Third National Fuels Meeting, American Society of Mechanical Engineers, Bellevue-Stratford Hotel, Philadelphia, Pa.*

7–11 *National Electrical Manufacturers Association, Wardman Park Hotel, Washington, D. C.*

10–12 Third Annual Conference for Rural Service Men of Electric Light and Power Companies, Agricultural Experiment Station, Purdue University, Lafayette, Ind.

14–18 *American Gas Association, Atlantic City, N. J.*

17–18 Kansas Section, Wichita, Kan.

22 *The Electric Association, Chicago, Ill.*

22 Public Policy Committee, Edison Building, Chicago, Ill.

22 Public Policy Committee, Edison Bldg., Chicago, Ill.

23–24 Public Utilities Association of West Virginia, Wheeling, W. Va.

November

21–22 Public Utilities Association of Virginia, Chamberlain-Vanderbilt Hotel, Old Point Comfort, Va.

December

2–4 Secretaries' Conference, Drake Hotel, Chicago, Ill.

NEW MEMBERS

Light and Power Companies, Employees of Light and Power Companies, Invited Persons, Manufacturing Companies, Employees of Manufacturing Companies, Associated Companies, Employees of Associated Companies and Foreign Organizations who have recently become Members of the National Electric Light Association.

NOTE: Names of new individual members are shown in the following order: First, in italics, post office address of company employing new members, and on the same line, in Roman letters, the name of the company employing new members; on succeeding indented lines, names of new members followed by post office address.

Electric Light and Power Companies (Class A)

Massachusetts, Huntington, Huntington Electric Light Co.

New Mexico, Gallup, New Mexico Public Utilities Corporation

Employees of Electric Light and Power Companies (Class B)

California, Fresno, San Joaquin Light & Power Corporation
  M. E. Parsell
  Howard Sullivan (Clovis, Cal.)
California, Los Angeles, Los Angeles Gas & Electric Corp.
  M. A. Seeley
California, Los Angeles, Southern California Edison Company
  Miss Helen McMillan (Montebello, Cal.)
  Miss Alice Smith
  Mrs. Phylis Vauchlet (Glendale, Cal.)
California, Santa Cruz, Coast Counties Gas & Electric Company
  J. C. Barrington
  R. L. Vaughn (San Francisco, Cal.)
  Pierre Vinet
California, San Francisco, Great Western Power Company
  William K. Cullen
  S. J. Sherman (Napa, Cal.)
California, San Francisco, Pacific Gas & Electric Company
  A. R. Gledhill (Marysville, Cal.)
  Miss Mildred Hinrichs (Salinas, Cal.)
  Jas. R. Johnson (Placerville, Cal.)
  C. O. Phillips (San Jose, Cal.)
Illinois, Chicago, Bayfield Utilities Company
  Roy H. Okerstrom
Illinois, Chicago, Commonwealth Edison Company
  Miss Catherine A. McGuire
Illinois, Peoria, Central Illinois Light Company
  John T. Englis (Farmington, Ill.)
  J. Dale Frame (Elmwood, Ill.)
  Frank R. Kice (Washington, Ill.)
Indiana, Hammond, Northern Indiana Public Service Company
  William L. Lundy (East Chicago, Ind.)
  M. F. North (Fort Wayne, Ind.)
Indiana, Kokomo, Northern Indiana Power Company
  L. J. Evans (Wabash, Ind.)
Iowa, Dubuque, Interstate Power Company
  S. A. Jordan (Rochester, Minn.)
  Leonard Peterson (Crookston, Minn.)
Massachusetts, Brockton, Edison Electric Ill'g Co. of Brockton
  Miss Dorothy E. Johngren
Michigan, Detroit, The Detroit Edison Company
  Russell Fims
  E. O. George
  Neil Hollinger (Port Huron, Mich.)
Minnesota, Duluth, Minnesota Power & Light Co.
  C. R. Bailey
  C. C. Boswell
  J. E. Lynch
Minnesota, Fergus Falls, Otter Tail Power Company
  Thomas C. Wright
Minnesota, Minneapolis, Montana-Dakota Power Company
  W. L. Hayes
Minnesota, Minneapolis, Northern States Power Company
  Paul D. Austin
  O. C. Bieging (Stillwater, Minn.)
  Carl T. Bremicker (St. Paul, Minn.)
  Wm. H. Brown
  V. E. Engquist
  S. E. Hinkel (White Bear Lake, Minn.)
  George A. Hult (Sioux Falls, S. D.)
  E. J. LeBlond (St. Paul, Minn.)
  A. L. McIntyre (Stillwater, Minn.)

E. M. Morris (Minot, N. D.)
E. J. Niedekorn (Wabasha, Minn.)
M. J. Perkins (Mankato, Minn.)
E. C. Perschman
George H. Richardson (St. Cloud, Minn.)
S. S. Robinson (St. Croix Falls, Wis.)
H. W. Rugg (St. Paul, Minn.)
B. F. Smith
R. E. Steele
Elmer Swanson (Montevideo, Minn.)

New Hampshire, Portsmouth, New Hampshire Gas & Electric Company
Miss Sally Crockett
Miss Florence H. Norton

New Jersey, Newark, Public Service Electric & Gas Company
Bertil P. Dahlstrom
Bernard W. Mohring (Jersey City, N. J.)
Martin J. Newman

New York, Bronx, Bronx Gas & Electric Company
Edward De Graaf (New York, N. Y.)
William P. Jackson (New York, N. Y.)
Miss Florence Peters (New York, N. Y.)
M. A. Sippel (New York, N. Y.)

New York, Brooklyn, Brooklyn Edison Company, Inc.
Adolph Fibel
John F. Lambias, Jr.
Fred W. Young

New York, Mt. Vernon, Westchester Lighting Company
Edward F. Marr (White Plains, N. Y.)

New York, New York, Electric Bond & Share Company
Roger S. Coolidge
Paul L. Heslop

New York, New York, The New York Edison Company
Louis Frank Falkenstein (Astoria, N. Y.)
Eric Martin While
J. C. Ziegfield (Long Island City, N. Y.)

New York, New York, United Electric Light & Power Co.
Paul Clement Dupre
Lewis E. Wolfram

New York, Long Island City, New York & Queens Electric Light & Power Co.
P. F. Ankers (Jackson Heights, N. Y.)
Wm. Creel Aycock (Flushing, N. Y.)
George R. Barnet (Flushing, N. Y.)
Norman D. Bartlett (Woodside, N. Y.)
William H. Bossert (Jamaica, N. Y.)
Frank P. Cavello
James E. Chaplin (Flushing, N. Y.)
Walter Christian (Flushing, N. Y.)
Samuel N. Courtney (Woodhaven, N. Y.)
Floyd L. Dapson (Flushing, N. Y.)
Thomas C. Duncan (Flushing, N. Y.)
W. Francis Dunn (Flushing, N. Y.)
Russell L. Funk (Brooklyn, N. Y.)
Herbert B. Guckel (Elmhurst, N. Y.)
Harold J. Hardiman (Ridgewood, N. Y.)
John L. Hayward (Flushing, N. Y.)
Daniel Ihasz (Elmhurst, N. Y.)
Herbert C. Jonas (Flushing, N. Y.)
James Keogh (Brooklyn, N. Y.)
Geo. W. Kinder (St. Albans, N. Y.)
Fred J. Krampert (Queens Village, N. Y.)
Henry Kurtz (New York, N. Y.)
Creston F. Laager (Flushing, N. Y.)
Edmund Lazard (Richmond Hill, N. Y.)
Charles F. Lingle (Woodside, N. Y.)
Thomas Lyons (Elmhurst, N. Y.)
Arthur McSheffrey (Forest Hills, N. Y.)
James G. Meenahan (Woodhaven, N. Y.)
John J. Mehrtens (Edgemere, N. Y.)
James J. Mohen (Woodside, N. Y.)
Paul Mrstik (Elmhurst, N. Y.)
Thomas J. Noonan (Jackson Heights, N. Y.)
Victor Novarino (New York, N. Y.)
James L. O'Dowd (Flushing, N. Y.)
Joseph J. O'Leary (Flushing, N. Y.)
James H. Pim (Flushing, N. Y.)
Ernest L. Plant (Flushing, N. Y.)
Marion F. Raines (Richmond Hill, N. Y.)
Edmund H. Scheick (Woodhaven, N. Y.)
Edwin A. Sherman (Richmond Hill, N. Y.)
John F. Sorosick (Oyster Bay, N. Y.)
Herbert H. Stauss (Brooklyn, N. Y.)
Joseph H. Steinbach (Flushing, N. Y.)
John W. Sweeney (New York, N. Y.)
Maurice J. Van Biene (Brooklyn, N. Y.)
Roger E. Warden (Flushing, N. Y.)
Miss Kathryn Yula (Whitestone, N. Y.)

New York, Niagara Falls, The Niagara Falls Power Company
Earl B. Strowger

New York, Poughkeepsie, Central Hudson Gas & Electric Company
F. M. Greene (Wappingers Falls, N. Y.)
Ernest W. Hover
William B. Lee
C. I. Richards
R. Raymond Ricket (Rhinebeck, N. Y.)

Oregon, Portland, Portland Electric Power Company
Verne Hansen
L. A. Kallen
Norman B. Whittier

Pennsylvania, Allentown, Pennsylvania Power & Light Company
Morris Oppenheim (Harrisburg, Pa.)
Richard J. Prince

Pennsylvania, Oil City, Keystone Public Service Company
Jos. Riesenman, 3rd (Franklin, Pa.)

Pennsylvania, Pittsburgh, West Penn Power Company
H. E. Burcher
Donald D. Dalrymple
Charles L. Goodman, Jr.

Pennsylvania, Reading, Metropolitan Edison Company
Leo S. Hay

South Carolina, Charleston, South Carolina Power Company
Dean H. Davis
R. A. Easterling (Denmark, S. C.)
H. H. Higgins
C. B. McCleary
Miss Gene Seel
C. D. Smith
L. C. Waring, Jr.
C. C. West

South Dakota, Huron, Northwestern Public Service Company
E. W. Dempewolf (Redfield, S. D.)

Tennessee, Chattanooga, Southern Cities Power Company
Edward L. Fortin (Philadelphia, Pa.)

Washington, Spokane, Washington Water Power Company
Miss Edith L. Hedger

Wisconsin, Amery, Wisconsin Hydro-Electric Company
F. P. Hyer

Wisconsin, Madison, Wisconsin Power & Light Company
Richard T. Perry

Canada, N. B., Grand Falls, Saint John River Power Co.
A. H. Tweedie, Esq.

Employees of Manufacturing Companies (Class E)

Connecticut, Bridgeport, Bryant Electric Company
J. A. Gibson (Montreal, Quebec, Canada)

Illinois, Chicago, Curtis Lighting, Inc.
P. M. Rutherford, Jr. (Atlanta, Ga.)

Massachusetts, Ashland, Warren Telechron Company
Guy Cooper (Los Angeles, Cal.)

Massachusetts, Boston, Walker & Pratt Mfg. Co.
J. L. White (Seattle, Wash.)

Michigan, Bay City, Kuhlman Electric Company
Roy C. Young

Michigan, Detroit, Kelvinator Corp.
H. A. Dahl (Minneapolis, Minn.)

Missouri, St. Louis, Wagner Electric Corporation
Malcolm E. Cundall (Seattle, Wash.)
Raymond M. MacPherson (Portland Ore.)

New Jersey, Harrison, Edison Lamp Works of G. E. Co.
D. Axman (Chicago, Ill.)

New York, New York, Graybar Electric Company
Martin Buehler (Minneapolis, Minn.)
Earl Sharpe (Minneapolis, Minn.)

New York, New York, Habirshaw Cable & Wire Corporation
Edw. J. Jeep (St. Louis, Mo.)

New York, New York, Johns-Manville Corporation
C. L. Buratti (Los Angeles, Cal.)

New York, New York, The Okonite Company
T. T. Kennedy (San Francisco, Cal.)

New York, New York, Safety Cable Company
Allen D. Pettee

New York, New York, Westinghouse Lamp Company
M. H. Anderson (Minneapolis, Minn.)
Ralph Neumuller

New York, Schenectady, General Electric Company
Thurber Day (Minneapolis, Minn.)
W. C. Goughmour (Chicago, Ill.)
Paul B. Reed (Minneapolis, Minn.)
W. C. Whitaker (Riverside, Cal.)

Ohio, Cleveland, Electric Vacuum Cleaner Co.
P. E. Dempsey (Minneapolis, Minn.)

Ohio, Dayton, Frigidaire Corporation
W. A. Allen (Oakland, Cal.)

Pennsylvania, East Pittsburgh, Westinghouse Electric & Mfg. Co.
C. H. Brunner (San Francisco, Cal.)
Ralph T. Chase (San Diego, Cal.)
George B. Germain (Minneapolis, Minn.)
J. O. Hoeffler (Minneapolis, Minn.)
Norman Steward (Minneapolis, Minn.)
W. G. Willson (Phoenix, Ariz.)

Associated Companies (Class F)

New York, New York, Business Week
Pennsylvania, Philadelphia, T. Herbert Clegg
Canada, B. C., Kelowna, Trenwith Limited
Canada, N. S., Glace Bay, Dominion Coal Company, Limited
Canada, Quebec, Quebec, J. J. Seguin Company, Limited

Employees of Associated Companies (Class G)

California, Los Angeles, Philip H. Gough
W. D. Kaemper (San Francisco, Cal.)

California, Los Angeles, Jones-Lyman & Company
Fred A. Grote

Minnesota, Minneapolis, Page & Hill
Hart Anderson

Minnesota, St. Paul, Jobbers Supply Company
J. S. Joy

New York, New York, Stevens & Wood, Inc.
Leon Thomas Russell (Jackson, Mich.)
Paul A. Vickers (Chattanooga, Tenn.)

Pennsylvania, Philadelphia, The Bell Telephone Company of Pennsylvania
William L. Stocks (Altoona, Pa.)

Canada, N. S., Glace Bay, Dominion Coal Company, Ltd.
E. L. Martheleur, Esq.

Foreign Members (Class H)

Argentine, Buenos Aires, Jose M. Hernandez Suarez
China, Hong Kong, Kowloon, China Light and Power Co., Ltd. (1918)

Employees of Foreign Members (Class I)

Cuba, Havana, Cia Cubana De Electricidad
Clarence F. Walter

Investment Merit

(*Continued from page* 589)

further operating economies through engineering development, and cooperative achievement of operating companies.

Financial organization of Electric Utility Companies demands continual appeal to investors for funds bringing about a wide market for securities. Stability of earning power assures safety of capital. The record of management has been one of successful achievement.

Regulation by state utility commissions assures proper financing and adequate but not excessive rates. Possibility of an increasing degree of regulation by individual states seems imminent, but not to the investor's disadvantage. Such regulation should minimize the possibility of development of any financial weakness or irregularity of management in the industry, and tend to eliminate agitation for Federal control and Government ownership.

Confidence in the industry is evidenced by the large numbers of customers and employees who have subscribed to stock issues, and recognition of certain classes of securities for legal investment establishes high investment rating. Stock issues have been in such demand that at times securities of some companies have been out of line with reasonable prices, established on apparent intrinsic values, but inherently the industry is sound, and such overpricing merely represents an expression of the investor's faith in the future. Management will undoubtedly further the industry's success in so conducting operations and directing policies that capital will continue to be attracted on a favorable basis.

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THE PRESIDENT'S PAGE

Looking Back

IN our celebration of Light's Golden Jubilee there has passed almost unnoticed another anniversary of an event of major importance in our industry.

On September 4, 1882, Edison's Pearl Street generating plant in New York City was opened to public service.

Ours is a forward-looking, forward-striding industry, but there is a tremendous inspiration in looking back to that event. Looking back implies having reached a point to look back FROM. The progress of our industry from 1882 to 1929—only 47 years—is nothing short of astounding.

Generators in that station were rated at 125 H.P. Today there are in use turbo-generators of 210,000 H.P., with bigger ones building. The total generating capacity of the central station in the country is about 38,000,000 H.P. We have 132,000 volt underground cables and 220,000 volt overhead lines. We have interconnected transmission systems covering states and groups of states.

The Pearl Street Station started with 59 customers whom it served free for several months. Our industry now has 24,000,000 or more customers. It doesn't serve them free, but it has a record of steadily lowering prices.

Technical improvements, commercial enterprise and those steadily lowering prices have made electric service so essential in homes, stores and factories that our country uses as much as all the rest of the world. Our nation's industrial supremacy and high standards of living are based on electrical power.

Pearl Street was a beginning. We have progressed far in a short time. Yet what the industry has done up to now is only a good beginning of its ultimate usefulness. Our pride in present accomplishments should only stimulate our zeal for greater accomplishment in future.

MSSloan

President.

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A Voluntary Organization of Companies Engaged In, and Individuals Affiliated With, or Interested In, the Electric Light and Power Industry: "Organized to Advance the Art and Science of the Production, Distribution and Use of Electrical Energy for Light, Heat and Power for Public Service."

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Lexington	5035	J. O'R. Coleman and Engineering Department
Lexington	3312	Editorial Department

The Electric Water Heater

WITH each new investigation of the characteristics of the Electric Water Heater, the great possibilities of this device as a load builder become more and more evident. The studies upon which present day practice in this field are based have been conducted largely by individual companies. In some instances, the companies have followed a definite plan, investigating the possibilities from the standpoint of central stations, while in others, the work has been delegated to individuals within the company who have been empowered to investigate all phases of the subject. Both methods have definite advantages and both have yielded results of extreme value to the industry.

A concrete example of what can be done by an individual is the investigation conducted by Mr. H. Geo. D. Nutting, of the Detroit Edison Company, and described in his paper entitled "The Electric Water Heater," which appears in this issue. This paper was selected for the McGraw Prize Award as one of the three best papers on any engineering or technical subject relating to the Electric Light and Power Industry. It well deserves this distinction as Mr. Nutting has tackled the problem with the utmost sincerity and has made a definite contribution to the existing knowledge on the subject. Mr. Nutting's paper represents his personal contribution to the industry and, to quote, ". . . the writer's conclusions are not to be interpreted as" those of the Detroit Edison Company, by whom he is employed, nor those of the N. E. L. A. Water Heating Committee, of which he is a member and which is now actively engaged in investigating electric water heating on a national basis.

In this connection one of the representatives of the committee has just completed a 10,000 mile trip, the results of which are most gratifying as a wealth of data has been collected. The investigations of the individual companies which have heretofore been available to only a few will now be accessible to all. These data, as well as a large amount from foreign countries, are being carefully digested with a view to producing a single complete picture out of a multitude of units.

The basic factors which are still indefinite and which are of utmost importance are (1) the diversity and (2) the load factor of the various types. Arrangements for tests to determine these have been completed and tests are already under way in Seattle. The magnitude of the task undertaken by the committee becomes evident only when we recall that each of these tests involves the installation of instruments on approximately 100 heaters and many thousand calculations to obtain the final results, as well as the fact that to be truly representative the tests must be made on several types of heaters under different climatic conditions. This is all necessary for a complete picture, and how much more valuable is the complete picture than the isolated sections.

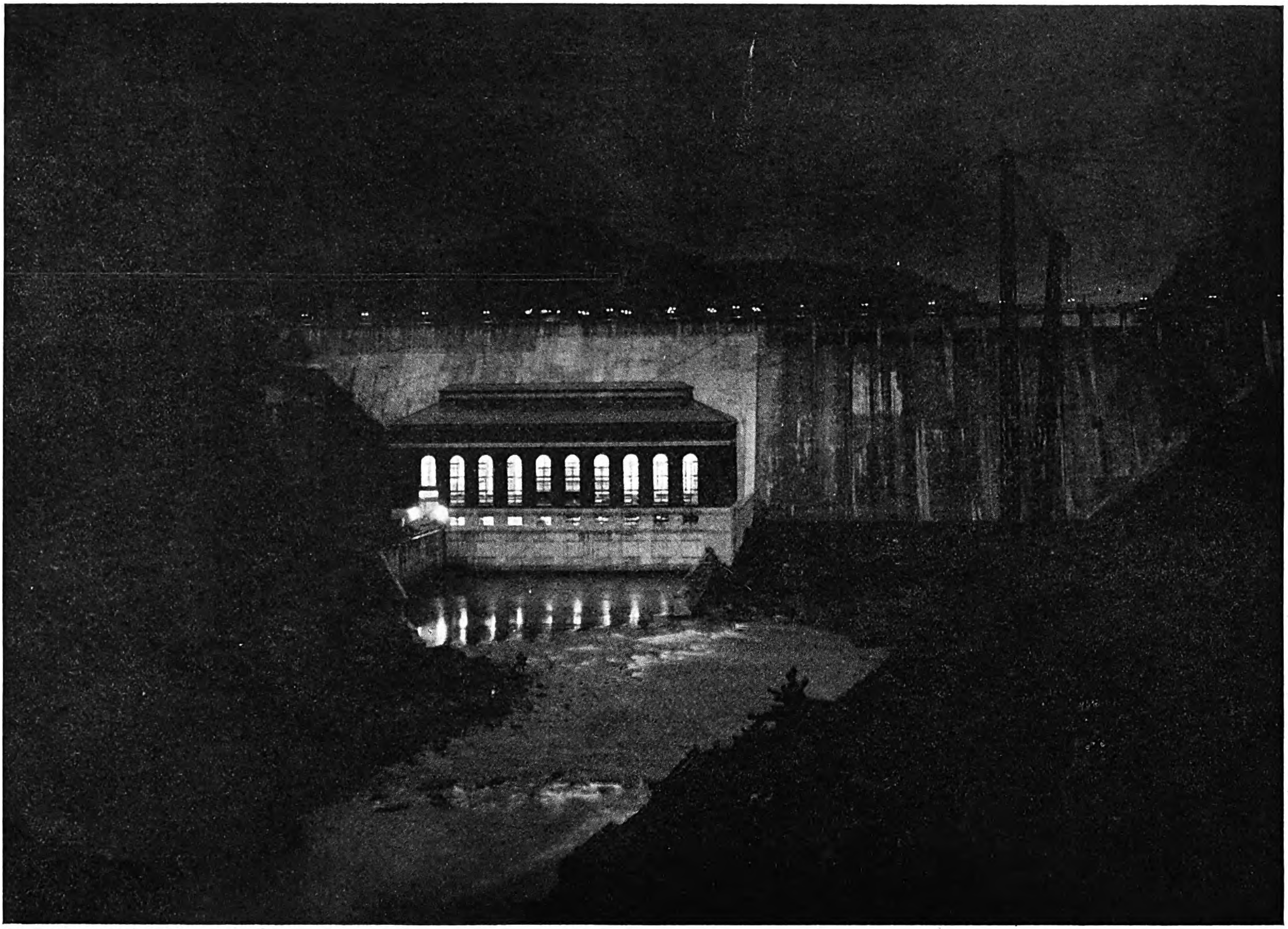
Edison's Lamp

IN the seventh of his articles appearing under the main title of "Behind the Veil," Mr. Ernest Greenwood has provided an account of the genesis of the incandescent lamp which, in addition to being a valuable contribution to the popularization of the subject, should do much towards correcting any misunderstanding of the reasons for the World-wide celebration of Light's Golden Jubilee.

To many it may appear odd that there is any need for explanation. Yet, when a work so carefully assembled and so scrupulously edited as the Encyclopedia Britannica can credit Sir Joseph Swan as the inventor of the first practical incandescent lamp, it is not surprising that some of our English friends feel that the honors that are being shown Mr. Edison properly belong to, or at least should be shared with Sir Joseph. Swan's contributions to electrical development were of the highest order, and he is indubitably entitled to a deal of credit for his work, yet the fact remains that he cannot be properly ascribed as the inventor of either the first incandescent lamp or the first commercially practical lamp.

To De la Rue goes the honor of inventing the first experimental incandescent lamp, in 1820. Between that date and the time of Edison's historic demonstration of Oct. 21, 1879, a number of other experimenters had produced incandescent lamps of various types. However much the lighting art may owe to this pioneering work, the inescapable truths stand out that none of these lamps was capable of commercial development; none was more than a laboratory experiment; and that Edison demonstrated, on Oct. 21, 1879, and in advance of contemporaneous workers, an incandescent lamp whose resistance, current consumption, life and cost made its use commercially practicable. From that lamp it can well be said the real beginning of the electrical industry, with its great contributions to human welfare, dates.

The 53rd Convention
of the
National Electric Light Association will be held in
San Francisco
the week of June 16, 1930



POWER HOUSES BY NIGHT

The Georgia Railway and Power Company's Dam and Power House at Tugalo

N·E·L·A·
BULLETIN

October, 1929 Vol. XVI No. 10

Consolidations in the Electric Utility Industry

No Development in the Economics of Our Business Should Be Permitted to Obscure Our Desire, Our Willingness and Our Interest to Carry on in Accordance with the Public Interest

By M. S. SLOAN
President, National Electric Light Association

LIKE other large business, the power and lighting industry is now in the midst of a period of reorganization into larger units. Operating companies in our industry are being merged, and holding companies are being combined into bigger ones or grouped together under common control. The reasons for this are the same with us as the reasons which are back of similar developments all over the business world. Conditions of American business life have changed, and methods and machinery have had to change in accordance with those changed conditions. Mass production, mass merchandising and vast capital requirements make necessary business set-ups on a different scale from those existing before the World War. The demands of today on business are great. Great business organizations are necessary to meet these demands properly.

Mergers and combinations of companies are undertaken in order to produce and permit economy in raising new capital, to bring about economies and betterments in operation, to stimulate the marketing of products through unified control and management, or for all of these reasons.

There is sufficient evidence within our industry to prove to us that consolidations and combinations, when wisely conceived and ably administered, do produce the benefits they were formed to bring about. That is the general rule. It need not always be true, and perhaps has not been in every instance. It has been so true in general, however, that to us it justifies what is now taking place on a broad scale, and what seems destined to continue within our industry.

This address was given before the Great Lakes Division, N.E.L.A., Convention, held at French Lick Springs, Ind., Sept. 26-28.

This state of affairs is not clear to the public, either as to our own business or others. There is some acceptance of it as necessary and desirable. There is, on the part of some, a disposition to regard it as inevitable and to hope for the best out of it. There is some downright and outspoken antagonism toward it. Particularly is antagonism evident toward such developments in our industry. It is said that the "power trust" is gobbling up the country. It is alleged that consolidations and combinations are stock jobbing deals, intended only to yield profits to their promoters. It is an oft-voiced fear that the public, our customers, will gain no good out of this situation, but will be victimized in the long run.

The development towards more efficient groupings is an inevitable and logical economic compliance with present day economic conditions. Yet we should be blind if we did not recognize that this development will progress and yield the desired results it is expected to yield only as and when it is understood and accepted by the public, which makes or unmakes business and particularly our business, public utilities. The public will not accept this development in our business on the sole basis that it is necessary and good for us. It will be accepted only as it is proved to be good for the public also. In my judgment it has not yet been so proved to the public's complete acceptance. The public is manifestly suspending judgment.

The development and progressive usefulness of our industry in future is largely dependent on the evolution represented by these mergers and groupings. They are the means, in the main, by which the power and light companies in future will be adequate for their work, as their job of serving the public grows. If this development within our industry should be hampered or checked, we, as individual companies and as an industry, would suffer. The public dependent on our service would also suffer to just the degree to which our companies were handicapped or rendered inadequate in supplying a service constantly being improved, constantly expanding to meet customers' requirements. Such a situation would be lamentable from our selfish point of view as business organizations. It would be lamentable also from the point of view that we are public service organizations charged with the duty of meeting the nation's requirements for electric service.

The present condition of the public mind in respect of this development presents a distinct and serious problem to the power and light industry. We are directly concerned, and we are responsible for the solution of this problem of gaining comprehension of the existing state of affairs and acceptance of it now and for the future. The industry will have to meet this situation. It is, in my judgment, able to meet it beyond question.

The public will accept these mergers and consolidations, will approve and welcome them, in fact, just exactly as soon as it is convinced they are in the public interest as well as in our interest. Benefits to society at large must come out of them as well as benefits to the companies concerned. These must be benefits that can be measured, understood, gossiped about by the rank and file of our customers.

As companies and as an industry we shall be judged, not by what we say or believe about the necessity of this phase of our progress or its benefits, but by results which the public can appreciate. It is up to us to produce such results. As we do this, the size of companies or combinations of companies will make no difference. The public is not worried about size as such, and is not necessarily afraid of the big concern more than the small one. What it wants is assurance that concerns grown huge have not also grown to be regardless of their obligation to the people they serve.

We have, therefore, a duty to the industry and a duty to the public in this situation. These duties coincide, for only by fulfilling our duty to the public can we properly fulfill our duty to the industry. If our companies benefit by consolidations and groupings, our customers also should benefit. If there are savings, the customers should receive their share of them. If the advantages of consolidation yield better operating conditions, larger sales, larger profits, the customers should get their advantages also in more current for less cost to them. This would not be altruism. It would be justice. Moreover, it would be plain business sense. It is now standard business practice in America to make your product as high grade as possible, to sell it at as low a price as possible, and to take the profits from the large volume of sales resulting. The power and light industry is doing that now to a considerable degree and is prospering as a result. The justification of larger units and more concentrated control in our industry will be the measure in which they enable us to extend and accelerate this practice. We shall be judged by results. It is up to us to produce results which speak for themselves.

We have, I believe, a further obligation in the present situation. People are, and I believe have the right to be, apprehensive lest the great combinations formed and forming grow beyond the control which it is deemed essential to have over public service organizations. It is often alleged that regulation of utilities has broken down or has failed to keep pace with changing conditions in the utility field. In New York State there is under way a legislative inquiry into the operation of regulation with a view to strengthening the law and its administration. The results of that investigation will undoubtedly have a far-reaching effect, producing similar undertakings in other states. I do not believe regulation has broken down or failed. What it has accomplished is frequently not understood by its critics, and still less by the general public.

There can be no question among us about the value of public regulation of public utilities. It unquestionably has contributed to the rapid progress of utilities and the improvement of utilities' service. It has been helpful to the utilities in establishing stable conditions for them, under which they could operate intelligently, knowing what they might do and what they might not do. This helped in obtaining the large sums of new capital necessary for our industry's expansion in recent years.

Regulation has been valuable to the public. It affords an orderly procedure for hearing complaints and conducting investigations, and has given assurance to the public against improper practices on the part of the utilities. It has done much for the public by holding the companies to high standards of service. It has been an important element in the establishing of fair and reasonable rates, by which I mean fair and just equally for customers and companies. This has by no means meant reductions in every case. Yet on the whole there has been a general lowering of rates by our industry over a period of years, and I think this may properly be attributed to the conditions set up by regulation.

Nevertheless, regulation, valuable as it unquestionably has been both to the utilities and the public, will be valuable in future only as it accurately and comprehensively reflects conditions which exist. I am sure our industry recognizes this fact. I believe it ought to put this recognition of fact into effect by supporting all wise and well directed efforts to bring laws into conformity with present conditions where they can be shown not to be so, to strengthen them properly, to extend them where extension is found to be necessary. There unquestionably is room for this in some states. I believe our industry can properly stand for stronger regulative commissions, better staffed and better equipped financially to do the job committed to them. There can result from wise, able, expert regulation by state commissions, made up of men who understand their subject, nothing but benefit for the public and the utilities.

Critics of state regulation are particularly outspoken at present in asserting that the public is unprotected, since public utility holding companies have not been brought within the scope of regulation. They clamor for regulation of holding companies. Some of the state commissions also have formally advocated the extension of regulation of operating companies to include regulation of holding companies. Here it seems to me we get into very difficult and debatable ground.

In the first place, just how, under any proposed law, is a holding company to be defined? Is an insurance company or a trust company having large investments in utility securities to be deemed a holding company and regulated? Or, is it to be deemed as being on a par with an individual having investments in utility securities? Is a corporation formed to handle the finances of an individual or family, and investing in utility securities to be deemed a holding company and regulated, or not? If it is to be regulated, how and how much? These are extremes, to be sure, but it is an axiom that proposed regulation must be considered in the extreme of its application.

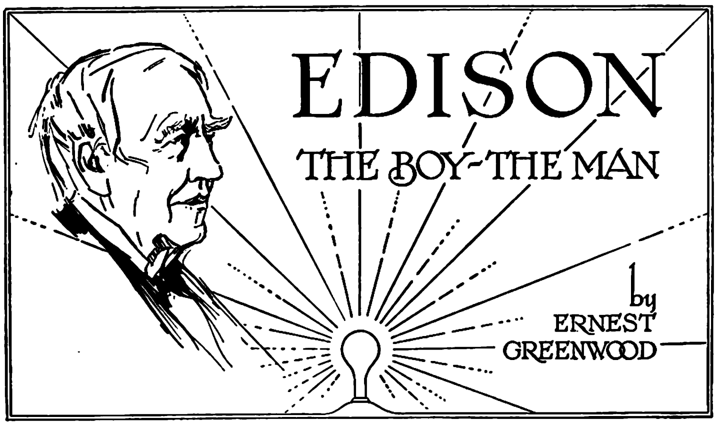
What of the company which is formed to purchase, hold, sell utility securities, which aids operating utilities in their financing, which issues its securities for public purchase, basing them on utility securities it owns? Is this company to be regulated, and if so, how? Is it required in the public interest to be supervised and regulated? Already such securities are carefully scrutinized under the so-called blue sky laws in 37 or 38 states, and must be approved in each state before they can be offered for sale there. And the operating companies, whose securities these holding companies own, are under some degree of supervision and regulation in the states where they are located.

What of the company which owns securities of operating utilities, issues its own securities against them to obtain funds to aid the operating companies in their financing, and which supplies special managerial, engineering, legal and other advice and services? This is the typical holding company as the public understands the term, the company which is supposed to be gobbling up operating utilities and swaying their destinies, though it may or may not have actual stock control of any one of them. Is this company to be regulated, and if so, how? It may have subsidiary companies in many states. Can any one of them exercise jurisdiction over it, or can all of them? To what degree may any one or all of these states exercise jurisdiction, and will such assertion of jurisdiction be uniform or will it vary? Must federal legislation be resorted to? If so, will it interfere with existing state regulation or supersede it? What public benefits will result from transfer of regulation from state to federal jurisdiction? The securities of this holding company, please remember, will be scrutinized and approved under the blue sky laws. Its subsidiary companies will be subject to regulation which obtains in the various states in which they operate. Can more or better supervision be provided?

These are all questions which will have to be resolved if any attempt at regulation of holding companies is made, and there are many others which only a lawyer could discuss, and over which lawyers, I am certain, would differ violently. It is evident that whether or not it is necessary for the public interest to undertake regulation of holding companies, the doing of it would be far from easy. Yet the situation confronts our industry.

It seems to me to be one which we should not shy away from. We should participate freely and frankly in any attempt to resolve these questions in the public's interest and in our own interest as an industry. For only thus will public understanding be gained and suspicion be abated.

Our industry can progress in future and develop to its maximum usefulness only as it possesses the confidence of the public. Our record in improving standards of service, in extending service to new customers and new territories, in reducing prices as efficiency and growth of business have permitted, has been impressive. That record, I am sure, will be continued. But as Owen Young so truly warned us a few years ago, the industry's progress must not be allowed to outstrip public understanding of it. No development in the economics of our business should be permitted to obscure our desire, our willingness and our intent to carry on in accordance with the public interest, and under such public control as a wise and informed public sentiment imposes on us.



N. E. L. A.

announces the publication of a life of

EDISON

By ERNEST GREENWOOD

(*author of Aladdin, U. S. A., Prometheus, U. S. A., and the "Behind the Veil" series now running in the* N. E. L. A. BULLETIN.)

WRITTEN in language that the boy and girl of grammar school age can readily grasp, the book also makes fascinating reading for the mature. It gives the high points of Edison's career, his inventions, his character and personality, from the time of the "weakly appearing" lad of five or six suspected of having "brain trouble" to the present, when all the world is celebrating his invention of the first practical incandescent lamp. 64 pages, 37 illustrations.

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NATIONAL ELECTRIC LIGHT ASSOCIATION
420 Lexington Avenue, New York, N. Y.

Behind the Veil

Corralling the Incandescent Lamp

By ERNEST GREENWOOD

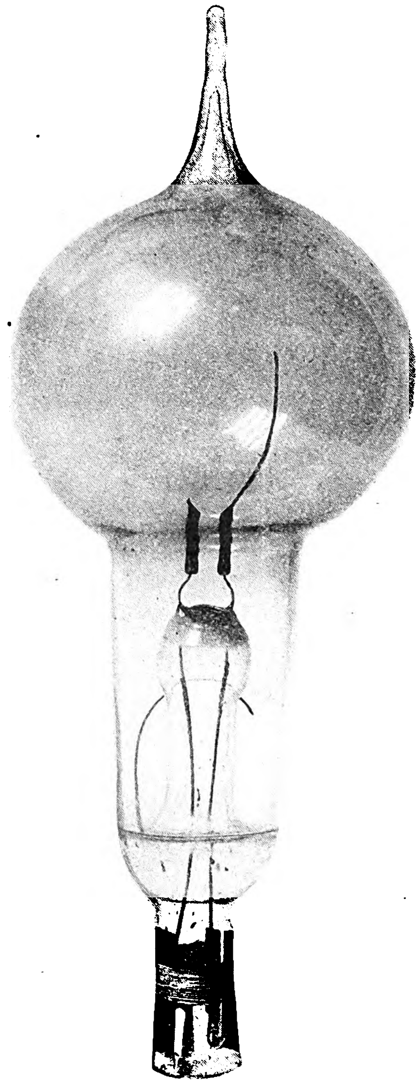
The seventh of a series of articles portraying, against a social-historic background, the evolution of the electrical industry and the chief personalities that have been instrumental in its growth.

WHEN was the incandescent lamp invented? If Edison didn't invent it, who did? And, if Edison didn't invent the incandescent lamp, what did he invent in 1879 that has caused almost the whole world to unite in celebration of Light's Golden Jubilee in his honor, and why was he given a Congressional medal, and what is it all about, anyhow?

It has never been claimed that Edison was the first man to make an incandescent lamp. In fact, the principle had been established by several experimenters many years prior to 1879—some of them before he was born. But in order to establish just what contributions Edison made to artificial lighting by electricity, it will be necessary to trace the history of incandescent lighting so that it will be proved conclusively—and it can be proved—that without his inventions during the period of 1879 to 1882 this form of lighting might have been for many years, or might have remained forever, nothing but an interesting laboratory experiment.

Most of the literature on this subject goes back no further than 1841, when the essential ideas of an incandescent light were described by De Moleyns, who, in that year, patented in England a crude electric lamp in which a platinum wire, to be rendered incandescent by an electric current, was inclosed in a glass bulb in which the air had been partially exhausted. But as early as 1802, Sir Humphrey Davy, who has been given the credit for the discovery of the arc light, gave several lectures before the Royal Society, and, incidentally, demonstrated that electricity would heat thin strips of metal to a white heat, causing them to oxidize so rapidly in the air that they literally burned up. Platinum, he found, would not oxidize so readily, so that it could be heated to a white heat and give light for a considerable length of time. This was undoubtedly the forerunner of the incandescent lamp.

The earliest record of any attempt to actually make an incandescent lamp was in 1820, when De la Rue made a lamp with a coil of platinum wire inclosed in a piece of glass tubing, the ends of which were capped with brass. It was supposed to have a partial vacuum, but how this was accomplished has never been made clear. It should be remembered that even up to the present a perfect vacuum never has been achieved, so we use the term vacuum only to indicate partial exhaustion of air. In any event, the basic principle was the same as that of the incandescent lamp today—a burner or "filament" inclosed in a partial vacuum and heated to incandescence by an electric current. The difficulty was with the "filament." Platinum only becomes incandescent at a temperature which is very close to its melting point, and at this temperature it disintegrates rapidly. Furthermore, in those days the only electric current available was from batteries, and the cost would have made the operation of any such lamp prohibitive. The De la Rue lamp is of historic value only.



(*Photograph Courtesy Mr. Frank A. Wardlaw, Secretary, Edison Pioneers*)

The original EDISON paper horseshoe filament lamp used in the historic demonstration of the Edison Electric Light at Menlo Park, N. J., Oct. 21, 1879

In 1840, Sir William Grove gave a lecture before the Royal Society during which he demonstrated his battery by lighting the auditorium with incandescent lamps. These lamps consisted of a coil of platinum wire fastened to the ends of copper wires, the lower part of which were varnished for insulation. The platinum wire burner or "filament" was covered by a glass tumbler to protect it from the air. The open end of this tumbler was set in a glass dish partly filled with water through which the copper wires extended, thereby making a seal which prevented any air, except that already in the glass, from reaching the burner.

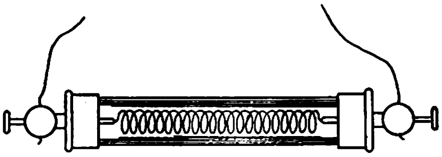
The trouble with this lamp or, in fact, any lamp based on this principle, was the enormous amount of current required to keep the platinum incandescent. Current could be obtained only from batteries at that time, and it has been estimated that the cost of current with Grove's battery was at the rate of several hundred dollars a kilowatt-hour. As a comparison, the present general average retail rate in this country is only a little more than six cents a kilowatt-hour.

The first patent on an incandescent lamp was granted by the British Government to Frederick De Moleyns in 1841. His lamp, which was quite novel, consisted of a spherical glass globe, in the upper part of which was a glass tube containing powdered charcoal. This tube was open at the bottom and through it ran a platinum wire coiled at the end inside the tube. Another platinum wire extended upward from the bottom of the globe, through the tube, and also ended in a coil, the end of which was close to that of the other coil. The powdered charcoal in the glass tube filled the two coils, bridging the gap between them. Current flowing from one platinum wire to the other through this bridge of powdered charcoal made the latter incandescent.

The most interesting of the incandescent lamps which were a product of this period was that devised in 1845 by J. W. Starr, an American living in Cincinnati, and on which he obtained a patent in England. Unfortunately this patent was taken out in the name of his attorney, and it has been asserted that this attorney so manipulated affairs as to keep Starr in the background and deprive him of any reward or credit for this and other inventions that anticipated much valuable work of a later date.

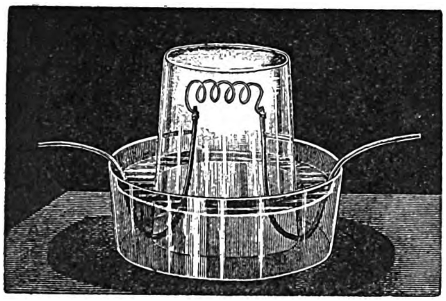
Starr actually invented two incandescent lamps. One consisted of a strip of platinum, the active length of which could be adjusted to fit the strength of the battery used so that the burner would operate at the proper temperature. It was covered by a glass globe to protect it from the air. The other lamp consisted of a carbon rod operating in a vacuum above a column of mercury. A platinum wire was sealed in the upper end of a tubular glass bulb, inside of which was a thin slab of carbon attached to the platinum wire by an iron clamp. The lower end of the carbon slab was attached by another iron clamp to a long copper wire. Fused to the bottom end of the tubular glass bulb was a narrow glass tube, open at the end, and a little over thirty inches in length, into which the copper wire extended. The bulb with its extended glass tube was filled with mercury and set in a dish containing mercury, so that part of the mercury ran out of the bulb until the top of the mercury column came to rest in the tube at about thirty inches above the surface of the mercury in the dish, as it does in a mercury barometer. This lamp was impractical, however, as it is known that such a vacuum as was caused in the tube contains water vapor, and that when the lamp is lighted, the heat will drive gases out of the glass, the carbon rod, iron clamps, etc., which will cause the glass to blacken rapidly.[1]

Unfortunately Starr died on ship board while returning to the United States. As early as 1844, however, he had called attention to his apparatus in an article in the Cincinnati *Advertiser* and proposed to install on high towers some lamps that would "enable a light to be diffused all over Cincinnati equal for practical purposes to that of daylight." His lamp is said to have given an excellent light and involved the essential elements of incandescent lamps of the present day.[2]



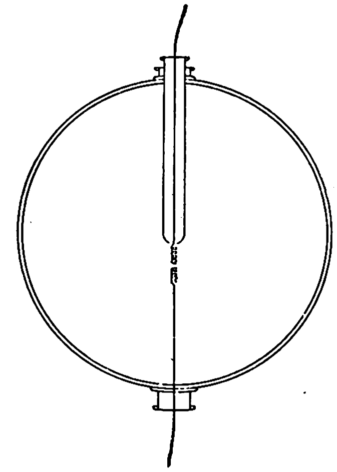
De La Rue's Incandescent Lamp, 1820

In this lamp, the first on record, a platinum wire operated in partial vacuum.



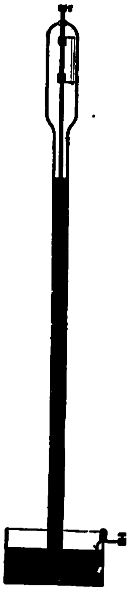
Grove's Incandescent Lamp, 1840

A coiled platinum wire burner was covered by a glass tumbler surrounded by water in glass dish.



De Moleyns' Incandescent Lamp, 1841

The first lamp on which a patent (British) was granted. Lamp contained powdered charcoal which filled and bridged the gap between two coils of platinum wire mounted in a globe from which air had been exhausted.



Starr's Carbon Lamp, 1845

This consisted of a carbon rod operating in partial vacuum above a column of mercury.

During the next few years a number of inventors tried to make incandescent lamps, in spite of the fact that their use with current from batteries would make them impractical because of the cost. The dynamo was being improved, but was still impractical commercially. In 1848, W. E. Staite made a lamp having a burner consisting of platinum and iridium operating in the air, but covered by a glass globe. In 1850, Edward C. Shepard made a lamp consisting of a weighted charcoal cylinder pressing against a charcoal cone in a partial vacuum. M. J. Roberts, in 1852, made a lamp having a graphite rod operating in a partial vacuum. In 1856, DeChangy, a French civil engineer, obtained a Belgian patent on a lamp having a coiled platinum wire for the burner which operated in air, but was covered by a glass tube to protect it from draughts. In 1859, Professor Moses G. Farmer, of the Naval Training Station at Newport, Rhode Island, made a lamp, several of which were used to light the parlor of his home. This lamp consisted of a strip of sheet platinum operating in air, the novel feature being that the strip was narrower at the ends than at the middle, causing it to be more uniformly incandescent. He obtained a United States patent on this feature many years later (1882). In fact, lamps were devised by scores of inventors, but most of them were little more than toys.

This brings us up to the work of Sir Joseph W. Swan, whom our English cousins claim is the real inventor of the incandescent lamp. In fact, Great Britain had a Light's Golden Jubilee all its own in 1928 in honor of the fiftieth anniversary of the incandescent lamp invented by Swan. It is, therefore, of some importance that the history of his work be reviewed with care if we are to actually determine who was the inventor of the first practical lamp based on the principle of incandescence.

Sir Joseph eventually became one of the foremost manufacturers of incandescent lamps in England. At various times, from 1848 to 1860, he made a number of experimental lamps, all of them consisting of carbonized strips and spirals of paper and cardboard, coated with various liquids, which, on being heated, left a large residue of carbon. These lamps were operated in partial vacuum, either in a glass bottle having a wide neck closed with a rubber stopper through which the connecting wires passed, or in a glass bell whose rim made a tight fit within the rim of a brass plate through which one insulated connecting wire passed, the plate being used as the other connection. Due partly to some trace of the air being left within the glass container, and partly to the carbons becoming distorted, the lamps soon broke down.[3]

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[1] See "The History of the Incandescent Lamp," by Howell & Schroeder.

[2] See "Central Light and Power Stations," (1902) U. S. Bureau of the Census.

According to an article entitled "Brief Personal Recollections in Connection with the Jubilee of the Invention of the Carbon Incandescent Lamp by Sir Joseph Swan in 1878," by V. A. Fleming, D.Sc., F.R.S., appearing in the *Journal of the Institution of Electrical Engineers* (Great Britain), "there was no inducement to continue these experiments until the invention of the dynamo and alternator had rendered possible the mechanical production of electric current. The improvements in arc lighting made in the early part of the decade 1870 to 1880 and the production of arc lamps carbons by F. P. E. Carre in 1876 stimulated attention once more to the problem of incandescent lighting. Sometime between 1876 and the middle of 1878 Swan must have turned his mind again to this subject." But what really happened?

One of the most important problems in connection with a practical incandescent lamp was that of securing a suitable vacuum within the glass bulb. In 1865, Herman Sprengel, by his invention of the mercury vacuum pump, was able to get a vacuum far superior to any previously attainable. In 1875, Crookes (afterward Sir William Crookes) astonished the world by the exhibition of his radiometer[4] and the description of the improved means he employed, in connection with the Sprengel pump, for obtaining the near approach to the perfect vacuum which the construction of the radiometer demanded. It was the publication of this paper which led Sir Joseph Swan to resume his incandescent lamp experiments.

In 1877, through a chance advertisement about radiometers, Swan got a young bank clerk to assist him in carrying out these experiments. Again referring to the article by Mr. Fleming, we are told: "Swan seems to have procured some very slender rods of carbon, prepared, I think, though I am not sure, by the Carre process, and attached to the end of one of these platinum wires by means of which he was enabled to seal it vacuum tight in a bulb wholly of glass and exhausted of its air, so that the carbon could be made incandescent in a high vacuum. Thus he produced the lamps used at his lecture on the 18th of December 1878, and one of these, as I have stated above, is now to be seen in the National Science Museum, London."

This, apparently, is the lamp on which our British friends base their claims that Swan was the inventor of the incandescent lamp. Turning to the "History of the Incandescent Lamp," by Howell and Schroeder, we find that "notwithstanding the fact that the lamp bulb had been highly evacuated, the vacuum rapidly deteriorated owing to the evolution of gases from the carbon, which took place as soon as the current was turned on. The difficulty was overcome by heating the bulb by a flame from the outside and then passing a strong current through the carbon to make it brilliantly incandescent *while it was still connected to the exhaust pump.* The straight carbon wires were found to buckle and so did not last, but the arch-shaped carbon wires gave good results."

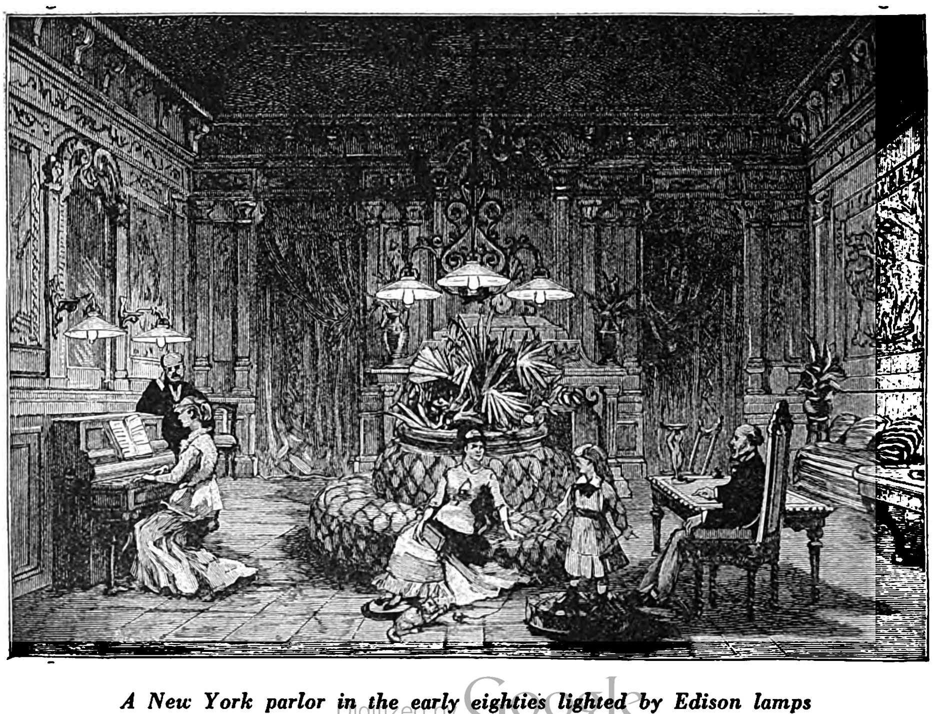
It is submitted that, while Swan at this time was making material contributions to the art of incandescent lighting, he had no more found a practical lamp than had Grove in 1840, or De Moeylns in 1841, or Starr in 1845, or any of the other of the innumerable inventors who experimented between 1820 and 1879.

Again returning to the article by Mr. Fleming, we find this statement: "*Early in* 1880, Swan devised an improvement upon the form of carbon conductor which he used in his 1878 lamp. He had evidently recognized that carbon could not be obtained in so suitable a form by cutting down a large mass of carbon as by carbonizing some organic material already in filamentary form. The material which he used for this purpose in his first form of practical lamp was cotton thread parchmentized by treatment with sulphuric acid and then carbonized by heating to redness *when packed in a crucible with carbon powder.*" I have italicized the date and the last few words of the past sentence because of their significance.

To the above statements Mr. Fleming adds: "Toward the middle, or close, of 1879, Swan and Stearn became aware that Edison had abandoned the use of metallic wires and had applied for patents for an incandescent lamp containing a 'filament' of carbon." This statement is also significant.

What was Edison doing all this time? In 1877, he and three other men were attacking the problem which was then popularly called "sub-dividing the electric light." William E. Sawyer produced a lamp which had a graphite burner operating in nitrogen gas. Professor Moses G. Farmer also devised a lamp consisting of a graphite rod operated in nitrogen gas. Hiram S. Maxim, well known for his later invention of the rapid fire gun, made two lamps, one consisting of a piece of sheet platinum operating in air and the other consisting of a graphite rod operating in rarefied hydrocarbon vapor and protected from excessive current by an electro magnet which short-circuited the graphite burner. Edison was the only one of the four who really solved the problem.

He first began his study of the incandescent lamp problem in the fall of 1877. None of the early work had left any permanent results and the "commercial sub-division of electric lighting" had been set down as impracticable by some of the foremost scientific authorities up to the very moment he produced his first lamps and used them for illuminating



A New York parlor in the early eighties lighted by Edison lamps purposes. He followed his usual procedure of checking and confirming the failure of others so that he might, so to speak, start with a clean slate. At this time he had a well-equipped laboratory at Menlo Park, with several able assistants and a considerable number of workmen. He had already made several important inventions, including the quadruplex telegraph, the carbon telephone transmitter, and the phonograph. He was eminently fitted to tackle the problem of the incandescent lamp.

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[3] See "The History of the Incandescent Lamp."

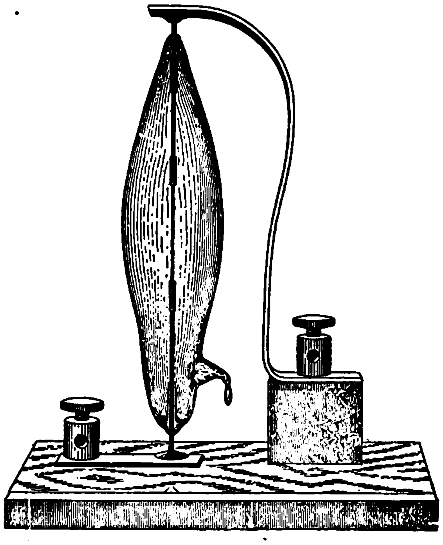
[4] The radiometer is an instrument for detecting and measuring radiant energy by converting it into mechanical energy.

Edison's experiments on carbon as a material for use in electric work began in 1876, but almost at the very beginning he became satisfied that this material was impractical for the incandescent burner and he started investigating platinum. He developed a lamp having a platinum spiral for a burner, on which a patent was granted in April, 1879, but he had been experimenting with strips of carbonized paper as an incandescent conductor as early as the fall of 1877, continuing along this line until January, 1878, and resuming again in the fall of that year.

Early in 1879, Edison realized that the solution of the problem to which he had set his hand would not be found merely in the production of a durable incandescent lamp—even if any of the lamps he had made up to that time had fulfilled that requirement. The other principal features necessary to sub-divide the electric current successfully were the burning of an indefinite number of lights on the same circuit, each light to give a useful and economical degree of illumination, and each light to be independent of all the others in regard to its operation and extinguishment.

What were the scientific men in England thinking about such a project early in 1879? About February of that year, Mr. (Sir) W. H. Preece, one of the most eminent electricians in England, after discussing the question mathematically before the Royal United Service Institution, said: "Hence the sub-division of the light is an absolute *ignis fatuus.*"

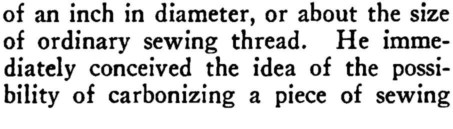
Paget Higgs, LL.D., D.Sc., in a book written by him and published in 1879, said: "Much nonsense has been talked in relation to this subject. Some inventors have claimed the power to 'indefinitely divide' the electric current, not knowing or forgetting that such a statement is incompatible with the well proven law of conservation of energy." The eminent scientist, John Tyndall, delivered a lecture before the Royal Institution on "The Electric Light" (January 17, 1879), when, after pointing out the development of the art up to Edison's work, and showing the apparent hopelessness of the problem, he said: "Knowing something of the intricacy of the practical problem I should certainly prefer seeing it in Edison's hands to having it in mine."


Swan Incandescent Lamp of 1878

Turning back, for the sake of emphasis, we again note that Swan's lamp of 1878 had been discarded as commercially impracticable, as had all other incandescent lamps which had preceded it during a period of nearly 60 years, and that toward the close of 1879 he "became aware" that Edison had abandoned the use of metallic wires and had applied for a patent on a lamp containing a "filament" of carbon, and that in 1880 he was still working on improvements on the carbon conductor. English scientists were almost unanimously agreed that the sub-dividing of the electric current which would make incandescent lighting commercially practical was an almost hopeless problem.

Edison had done a lot of experimenting with different forms of carbon for his telephone receiver and knew that it had a high resistance compared with platinum. He also realized that to get the requisite resistance for incandescent lamps, the carbon would have to be very slender. Thick carbon rods did not last long when subjected to the high temperature of incandescence.

So his first problem was that of obtaining carbon of the requisite slenderness, and of determining what its length and diameter should be. After considerable calculation, he estimated that the carbon should not be over a sixty-fourth of an inch in diameter, or about the size of ordinary sewing thread. He immediately conceived the idea of the possibility of carbonizing a piece of sewing thread by heating it in an air-tight crucible. He cut several pieces of thread, packed them with carbon in an earthenware crucible in U-shaped form, and heated them in a furnace to a high temperature for several hours. After many trials he obtained an unbroken carbonized thread, or "filament," which then had to be fastened to a pair of platinum wires. This was finally done after many failures. The filament was inserted in a glass bulb and the neck of the bulb sealed, the lamp being connected with a mercury pump and the air exhausted. What happened after that is told in an interesting way in "The History of the Electric Lamp."


Swan Lamp of later period

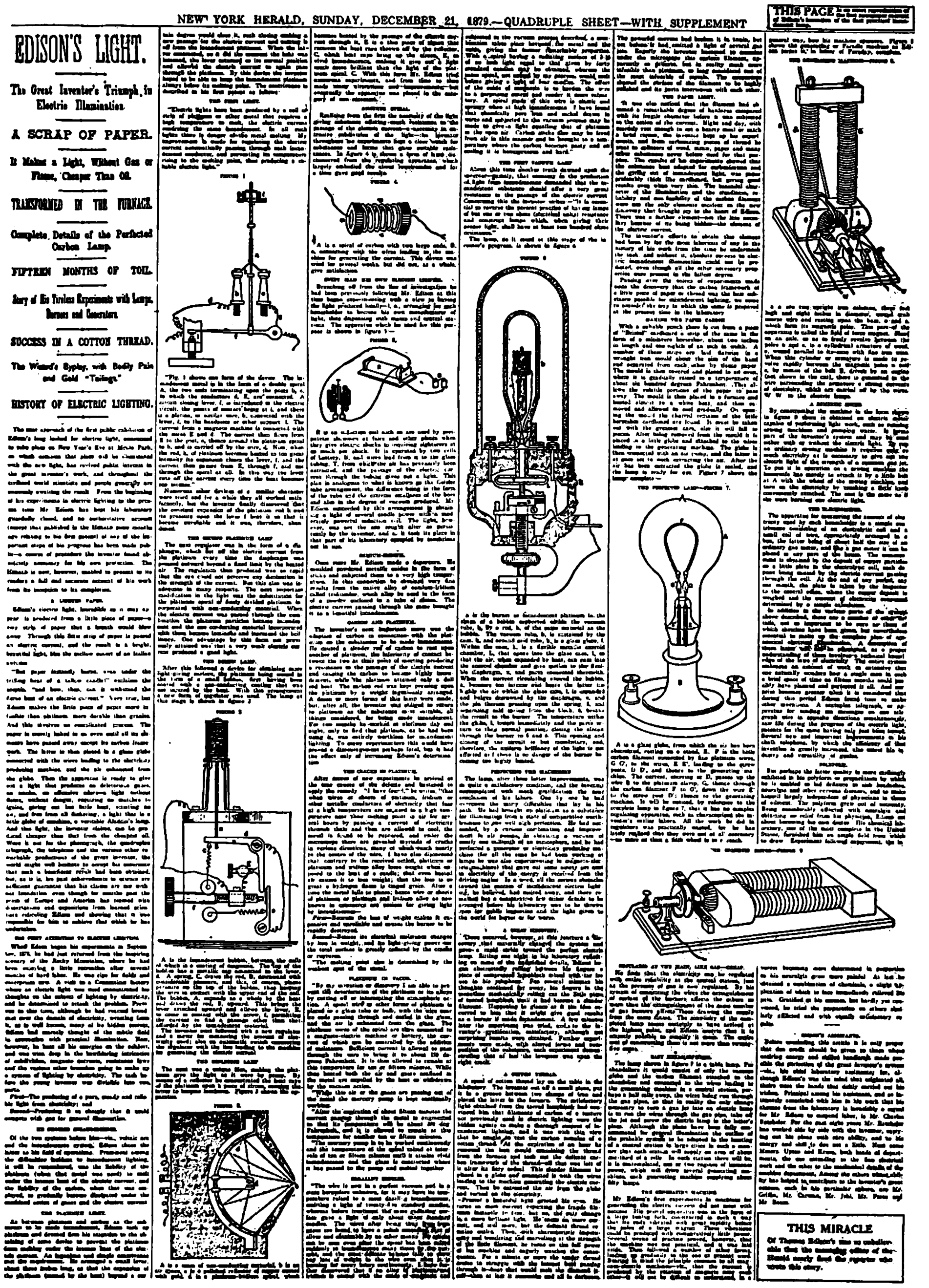
"The crucial time had come to try the lamp out. The men in the laboratory were skeptical about it and bets were made that it would last but a few minutes. With a crowd about him, Edison turned the current on gradually by means of external resistance until the filament glowed dimly. It did not burn out. Becoming bold, he gradually cut out the resistance until the lamp gave a brilliant light. Still it did not burn out. It continued to burn, and when evening came it was still going strong. This was *October* 21, 1879, and the lamp burned steadily for nearly two days.

"Edison now felt that he was on the right track, and everything conceivable was carbonized in the endeavor to make a better filament. After many weeks of working almost day and night, he found that carbonized paper (bristol board) would give several hundred hours' life. He then felt that he had a practical lamp which could be commercially used, so he decided to announce his invention and demonstrate it to the public.

"The announcement was made in an article which took the entire first page of the *New York Herald* of Sunday, December 21, 1879. Several scientists proclaimed Edison's invention to be a fake. Gas stocks, however, dropped in price and stock in the Edison Electric Light Company (which had been organized for the purpose of backing Edison in his work) soared to thirty-five hundred dollars a share.

"The demonstration consisted of about sixty lamps mounted on poles lighting the laboratory grounds and country roads in the neighborhood. Wires were also run to several houses and lamps installed in them. Crowds came out to Menlo Park during the next few days and the Pennsylvania Railroads had to run special trains to accommodate them."

Once more calling attention to comparative dates, Mr. Edison's first lamp, which burned for more than 40 hours, was demonstrated to his laboratory assistants on October 21, 1879. His first public demonstration was given about



NEW YORK HERALD, SUNDAY, DECEMBER 21, 1879.—QUADRUPLE SHEET—WITH SUPPLEMENT

THIS PAGE

EDISON'S LIGHT.

The Great Inventor's Triumph in Electric Illumination.

A SCRAP OF PAPER.

It Makes a Light, Without Gas or Flame, Cheaper Than Oil.

TRANSFORMED IN THE FURNACE.

Complete Details of the Perfected Carbon Lamp.

FIFTEEN MONTHS OF TOIL.

Story of His Tireless Experiments with Lamps, Burners and Generators.

SUCCESS IN A COTTON THREAD.

The Wizard's Byplay, with Bodily Pain and Gold "Tailings."

HISTORY OF ELECTRIC LIGHTING.

THIS MIRACLE

Reproduction of page from Dec. 21, 1879 edition of New York HERALD

December 20, 1879. He applied for a patent on this lamp on November 4, 1879, and the patent was granted on January 27, 1880. Sir Joseph turned his attention to carbonized organic material after he heard that Edison had abandoned the use of metallic wires and carbon pencils. He gave the first public demonstration of his lamp, according to Mr. Fleming, on October 20, 1880, and applied for a British patent early in that year. He organized a company known as the "Swan Electric Light Company" in February, 1881, for the purpose of manufacturing his lamps, while Edison had made his first commercial installation, on the steamship Columbia of the Oregon Railway and Navigation Company, on May 2, 1880. The plant on this ship was a complete success, running for fifteen years, when the ship was overhauled and a more modern plant installed. The first Edison lamp factory went into operation late in 1880. It is interesting to note that the Edison and Swan interests in England combined in 1883 under the name of *The Edison and Swan Electric Light Company, not* under the name of the Swan and Edison Electric Light Company.

Any story of the actual production of a practical, commercial, incandescent lamp would hardly be complete unless we pay our respects to the Encyclopedia Britannica. According to a story appearing in the *New York World* of September 15, 1929, this venerable publication calls Swan the inventor of the incandescent lamp, saying: "So far back as 1860 he constructed an electric lamp with a carbon filament, which was formed by packing pieces of paper or card with charcoal powder in a crucible and subjecting the whole to a high temperature. The carbonized paper thus obtained he mounted in the form of a fine strip in a vacuous glass vessel and connected it with a battery of Grove's cells, which though not strong enough to raise it to complete incandescence, were sufficient to make it red-hot.

"This was substantially the method adopted by Edison nearly twenty years later, after various fruitless efforts to make a practical lamp with a filament of platinum or a platinum alloy had convinced him of the unsuitability of that metal for the purpose—a conclusion which Swan reasoned out for himself many years before.

"By the time Edison had hit upon the idea of carbonizing paper or bamboo by heat to form the filament, Swan had devised the further improvement of using cotton thread 'parchmentized' by the action of sulphuric acid, and it was by the aid of such carbon filaments that on the 20th of October, 1880, he gave at Newcastle the first public exhibition of a large scale of electric lighting by means of glow lamps."

In view of the well-documented and authentic history of the incandescent lamp, the claim of priority for Swan is, of course, absurd.

There have been other claims from other countries with regard to the invention of the first incandescent lamp. The Electric-Technic Society of Hanover, Germany, for example, has recently unveiled a tablet to Heinrich Goebel as having invented the incandescent lamp some twenty-five years before the Edison patent was filed.

The Goebel claims were the cause of much litigation some thirty years ago and the case was finally settled by District Judge Colt in the Massachusetts Circuit Court in February, 1898. Reciting the history of the art out of which the incandescent lamp emerged, Judge Colt said: "To sub-divide the electric light and embody it in a cheap and durable domestic lamp, capable of successfully competing with gas, had for years baffled the science and skill of the most eminent electricians of this country and in Europe. The difficulty lay in the practical construction of a durable incandescent lamp, rather than in a knowledge of the elements which should compose such a structure.

"Carbon burners, platinum wires, exhausted glass receivers, were old and well known as early as 1845. Starr suggested in the King patent a lamp composed of a thin pencil of carbon, inclosed in a Torricellian vacuum; and Roberts in 1852 proposed to cement the nick of the glass globe into a metallic cup, and to provide it with a tube for exhaustion by means of a hand pump.

"Later, Lodvguine and others provided their lamps with several short carbon pencils, which were successfully brought into circuit as the pencils were consumed, also various devices for perfecting the joints between the metal base and the glass globe, while Sawyer and Man, in 1878, made the bottom plate of glass instead of metal, and charged the lamp with an atmosphere of nitrogen gas, to avoid destruction of the burner from oxidization. In his 1879 lamp, Edison used a platinum burner, which proved a failure, because the platinum melted near the point of incandescence."

Views of leading electrical experts in Europe were then quoted by the Court as being dubious that the problem of division of the electric light would ever be accomplished. Edison, however, persisted in his experiments, evolving the platinum model, in 1879, which was a failure but from which he developed later in that year the final model which was patented in January, 1880.

According to the Court, Heinrich Goebel's story runs thus: "He came to this country from Germany in 1849. * * * He learned to make the arc lamp, and he believed that an incandescent lamp could be produced by a small continuous carbon inclosed in an exhausted glass tube hermetically sealed. He also became familiar with the use of the common air pump, the blowpipe, the method of producing the Torricellian vacuum and the making of carbon conductors."

Then follows a description of Goebel's alleged experiments in New York with arc lamps, which led him to the incandescent type. His affidavit said that he constructed three types of such lamps between the years 1850 and 1872. He used one to illuminate a clock in his home and another on a wagon carrying a telescope, which he exhibited. The first type consisted of an exhausted glass tube, with leading in wires sealed into the inclosing chamber by fusion of the glass.

This model, together with two subsequent ones, were shown at his Monroe Street home. A fourth and much improved type of lamp, exhibited in the court action, was not disclosed to the neighbors and friends, whose testimonies supported Goebel's contentions.

"In the further support of the Goebel anticipation," said the court, "several experts give affidavits to the effect that the Goebel lamp, assuming that it was made prior to 1879, contains the broad invention covered by the second claim of the Edison patents, as it embodied the same combinations of a carbon filament with an all glass exhausted receiver and conductors passing through the glass."

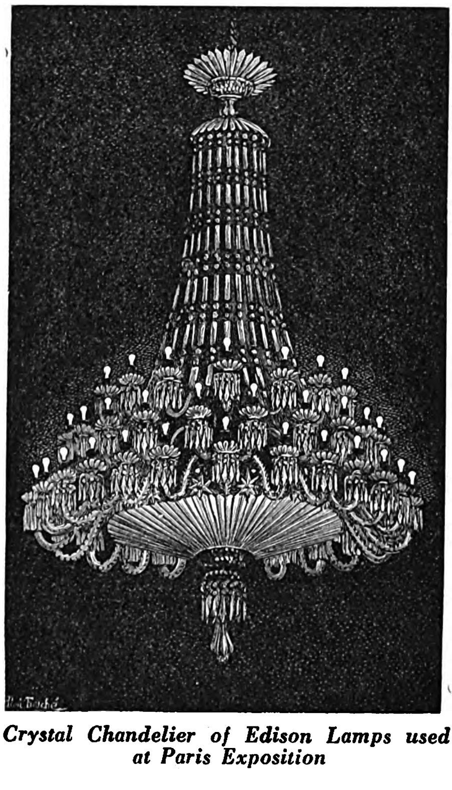
These experts further contend that the Goebel lamps had been operative and practical as lights. To refute these statements, the Edison Company submitted that the "history of the invention and the prior state of the art" did not justify the Goebel claims. Experts contended that the lamps, called exhibits 1, 2 and 3, "could not have been useful for ordinary lighting purposes and were never a practically operative light."

In rendering his decision, Judge Colt said:

"Whether Goebel made the fiddle-bow lamps 1, 2 and 3 is not necessary to determine. The weight of evidence on this motion is in the direction that he made this lamp or lamps similar in general appearance, though it is manifest that few, if any, of the many witnesses who saw the Goebel lamp could form an accurate judgment of the size of the filament or burner. But assuming they were made, they do not anticipate the invention of Edison.

"At most they were experimental toys used to advertise his telescope, or to flash a light upon his clock. . . . They were crudely constructed—their life was brief. They could not be used for domestic purposes. They were in no proper sense the practical commercial lamp of Edison. The literature of the art is full of better lamps, all of which are held to anticipate the Edison patent."[5]

This, apparently, disposes of the German claims, effectually. As a matter of fact, the Goebel lamp was an "experimental toy" and "in no proper sense the practical commercial lamp of Edison."



Crystal Chandelier of Edison Lamps used at Paris Exposition

Exactly the same thing can be said about the incandescent lamps devised by scores of inventors. This statement does not take away from them any of the credit which is due, because every experimentor must have made some contribution to the sum total of knowledge about artificial lighting by incandescence and consequently must have some claim on having contributed to the final result. The fact still remains that the Edison lamp was the first commercially practical lamp and the first to be patented and demonstrated to the public.

It may seem that because I have stressed the phrase "first commercially practical incandescent lamp" that I have set out to prove only that Edison was the real inventor of this lamp. This is not actually the case. What I have tried to justify is the celebration of "Light's Golden Jubilee" in 1929 as the fiftieth anniversary of the birth of incandescent lighting and in honor of Thomas A. Edison. The lamp itself was only one and, perhaps, a relatively unimportant factor, in the solution of the problems involved in this new type of lighting. Even before he had solved the problem of a practical lamp Edison recognized other and more difficult problems before the lamp would be very much more than the many "toys" which had preceded it.

He had to invent many things other than a practical lamp before he could claim to have produced a commercially practicable system of lighting with electricity. First he had to conceive and devise a satisfactory method of distributing electric current to houses, stores and factories. Then he had to invent his lamp. Following this he had to devise a meter so that the company furnishing the electricity could tell just how much current each customer had used. Then he had to devise a means of maintaining an even "pressure" of current so that the customer furthest away from the plant would receive the same amount of light as the customer near the plant, just as the customer of a gas company receives the same amount of gas, no matter how close or how far away he may be from the gas plant. Following this he had to design efficient dynamos, or generating machines, and means for regulating them. Finally he had to invent all sorts of things, such as switches for turning the current on and off, lamp holders, fixtures and the like; also means and methods for wiring houses.

In other words, Edison had to really invent a whole new system of artificial lighting, from the means of generating and distributing the current to the actual lamp and means for controlling it. Without *all* of these things, even his successful incandescent lamp would have been little more than an interesting experiment.

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[5] See *"New York World,"* September 15, 1929.

Constructively Iconoclastic or—Iconoclastically Constructive?

By AMPLIFIER

PERSONALLY, I think that is a great title for a piece. I know exactly what I mean, although I am not at all sure that college professors or purists (I am told there are such animals) will interpret it the way I do. But anyhow I think it is a swell title indicating culture, erudition and what-not on the part of the author. Furthermore, it was suggested by a friend of mine who is erudite beyond description, although it has been said that he is headed for the place so well advertised by the publicist Dante. He is so erudite that he keeps on his desk an old-fashioned salt shaker full of commas which he scatters all over any manuscript turning up in his office whether or not he has any legal, moral or educational right to touch it. Incidentally, he claims he is a "purist," but I doubt if he knows what a purist is—I think he got the word from a friend of his who is in the printing game and who sells him stuff by catering to his erudite complex.

Turning to Funk & Wagnalls College Standard Dictionary—if it must be known, everyone even remotely connected with the light and power industry is a college man and swears by Funk & Wagnalls because they publish the *Literary Digest*—I find that about the best definition of "Iconoclast" is "destroyer of images." There are a lot of vitamines in that definition with which to feed our mental processes while watching the world go by.

ASSUMING this definition to be correct—and who am I to question a College Dictionary?—then being an iconoclast is just being common. Intelligent perusal of the daily papers proves almost conclusively that there are more "destroyers of images" in the United States than there are makers of images. They seem to be all over the lot, and for some reason or other they manage to keep on the front pages of the newspapers most successfully.

I have no quarrel with the new order of things, recognizing that progress demands the upsetting, or tearing down, of the old and the substitution of the new therefor. It is all in the manner of approach.

It appears to me that much of the trouble with would be reformers is that they approach the subject blindly, thrashing about like a bull in a china shop, with no idea or regard for the damage being caused. Others there be, however, who approach a subject with the goal just as definitely in mind, but with a constructive thought of destroying as little as possible and at the same time building toward that goal.

These two groups I therefore segregate into the iconoclastically constructive, or those who tear down ruthlessly in order to construct, but without a definite idea of what the final result will be, and the constructively iconoclastic, who build up a sentiment, or a belief, in order to have something tangible as a substitution for the image they are aiming to eventually destroy.

Take the question of temperance. Not so very many years ago the progress which was being made by various individuals and organizations, operating on a local, State or nation-wide basis and engaged in selling the idea that temperance, with particular regard to alcoholic drinks, was the part of expediency and discretion, persuaded a lot of us that, after all, America is a temperate nation and inclined to listen to words of wisdom. Regardless of the fact that we, as individuals, may or may not have patronized them, the corner saloon loomed up as something of a growing menace, and even the least temperance-minded of us welcomed the idea of fewer but better saloons.

THEN along came prohibition and its supporters. The more fanatical set abou to destroy the image which had been set up. The United States of America, was, and is, a nation of drunkards, they said, and something must be done about it at once. And so our iconoclasts of the creed that only salutary laws will keep a people in order, set about to cram down people's throats a kill or cure prescription, when the milder dose of the real temperance homeopaths was quietly eliminating the disease of alcoholic intemperance, wherever it might exist, by the simple method of appealing to the intelligence.

Undoubtedly most of these people are sincere, although it might be suggested that the issue provides some of them with excellent livings. They wash out one of the fundamental principles on which our alleged government "of the people, for the people and by the people" is founded, and stand unashamed as iconoclasts—"destroyers of images" such as liberty and the inherent decency of the American people—basing their right to practice their particular form of iconoclasm on the theory that it is constructive. They are, I would say, iconoclastic constructively and not, by any means, constructively iconoclastic. As a matter of fact, they are not at all constructive.

Or, suppose we take the question of clothes. Self-appointed conservators of public morals have been thundering about the fact that the ladies persist in running about the streets in little more than their birthday clothes. Then along comes Bernard Shaw, who is nothing if he is not constructively iconoclastic, and tells us that clothes make for sex appeal, while nudity banishes it. But will these folks believe him? Will they realize the fact that it is only the men who wear clothes and that men are not supposed to have any sex appeal, dressed or undressed? They will not. They can be expected to start a campaign to take the clothes off the men and put them on the women, thus eliminating sex appeal with quite the same degree of success as others have eliminated the drinking of intoxicating liquor.

Suppose we look at the question of "lobbying," which seems to be occupying a deal of valuable space in the newspapers just at present. If we are to discuss the question intelligently, we must first understand what a lobby, or a lobbyist, or lobbyism is. Then we must know who are, and who are not, lobbyists. Therefore, the only thing to do is to turn once more to the good old college dictionary. Here we find that lobbying is "to try to carry (a bill) through a legislative body by outside influence." That is not a very satisfactory definition. My understanding of "lobbying" is that it is the profession of influencing legislation, and may take the form of trying to prevent the passage of a bill, or the alteration of the phraseology or intent of a bill, as well as an attempt to get a bill passed.

IF my interpretation is correct, then almost every intelligent person is a lobbyist; every editorial writer in the United States must be a lobbyist. Editorial writers are much given to trying to influence legislation by explaining to legislators, whether State or national, just what they should do with regard to a particular legislative project; and most certainly editorial advice is "an outside influence." Every individual business man who talks to the representative of his district, the United States Senator from his State, or a member of the State Legislature about pending legislation, is a lobbyist. Every industrial organization, every chamber of commerce, every organization of any kind, whatsoever its purpose may be, is engaged in lobbying if it dares even to express an opinion which may eventually get to anyone who may be engaged in making the laws of the nation and disturb the pristine purity of the atmosphere in which a certain type of iconoclast insists that they exist.

Turning to a rather stupendous and somewhat depressing work entitled "Group Representation Before Congress," published by "The Institute for Government Research of the Brookings Institute," we find that more than 500 "groups" have representatives in Washington. "An observer on the scene," says this report, "states that there are certainly more than a thousand representatives of organized groups in Washington, and probably nearly five thousand, if their clerks, aids, statisticians, publicity helpers, and others be included. This takes no account of the volunteer spokesmen that come to Washington from time to time to impress their views upon officials of the government."

WITHOUT doubt, lobbying is a national institution, and the question arises as to what to do about it and as to whether or not anything should be done about it. One prominent senator has lamented: "They (the lobbyists) are becoming as numerous as the lice of Egypt. A stone casually thrown in the streets of the city would probably hit half a dozen of them." Another senator has stated: "I have seen the corridors leading to the Finance Committee room of the Senate so filled with them that it was almost impossible for an outside senator to get to the committee room, and barely possible to get into it." Still another senator said on one occasion: "It is reaching a point nowadays where Congress is swarming with lobbies of every kind and description—some good lobbies and some bad lobbies."

To digress for a moment, the situation with regard to lobbying reminds me of a story of a Yale Professor in English Literature who, having delivered himself of a very serious discussion on Shakespeare, and noticing a great lack of interest, suddenly said: "All those who now believe that Bacon wrote the Shakespearian plays, please stand up." No one stood up. After waiting a moment or two he said: "All those who believe that Shakespeare wrote his own plays, please stand up." Again there was no response. Irritated beyond endurance, he then said: "All those who don't give a damn, please stand up." At that the whole class arose and quietly left the room.

For the sake of argument, it may well be that lobbying — an effort of outsiders to influence legislation—is entirely wrong in principle. If it is wrong in principle, then *all* forms of lobbying are wrong. It is wrong for a newspaper to print an editorial commenting on some proposed law. It is wrong to write to a congressman or to a member of a State legislature, or even to speak to him on the street. To invite him to dinner should be made a felony, under that hypothesis. If lobbying is wrong in principle, then the only thing left to do is to elect our legislators, place them under lock and key, and let them legislate to their hearts' content; it should be made impossible for them to receive any information of any kind from any group that may be affected by their lawmaking propensities; newspapers and periodicals of all kinds should be withheld from them; and the only guides allowed them limited to an encyclopedia, a dictionary, a copy of the Bible, existing statutes, and a set of bound volumes of the *Congressional Record.*

Pacifist organizations condemn the "bigger and better" Army and Navy folks while insisting that they be allowed to continue their own efforts to guide legislation with regard to these matters. Protectionists condemn the Free Traders and the Free Traders condemn the Protectionists. Advocates of various new, strange and untried methods of production and distribution condemn great national industries for trying to protect their interests from legislation which may be inimical to them, while insisting on their own right to scatter as much of their own propaganda around our legislative halls as they please. Advocates of government ownership and operation of all sorts of business conduct their lobbying and broadcast their propaganda, while at the same time attacking lobbying and propaganda because the owners of various private enterprises do not agree with them and do not hesitate to say so to anyone who will listen to them. If lobbying is really bad—and in using the word I use it in its all inclusive sense—then let's wash out all effort to influence legislation in every direction and allow the elected representatives of the people to do exactly as they please in accordance with their lights and particular abilities. If we are going to create a chaotic condition, let's make it a real chaos and be done with it.

PERHAPS the most interesting people who deal with national institutions with a mental attitude which is iconoclastic are those who are very certain that the present system of operating the great public services—the light and power companies, the telephone, the radio, the street railway and the steam railroad—must be, for some reason or other, all wrong. They constantly hold them up as the outstanding "menaces" to "life, liberty and the pursuit of happiness." To them, every day presents a crisis in human affairs, largely because these public services are necessarily prosperous, which, to them, does not seem to be compatible with the public interest. The very simple fact that without prosperity they could not give the service which has become so commonplace as to attract little attention, seems to be beyond comprehension. They are very sure that if once the stimulus of private initiative is eliminated and government substituted for it, everything will be right with the world.

According to Sir Ernest Benn, the great English economist, Plato, the Greek philosopher and disciple of Socrates, was the first to advocate the public ownership of property and, as he says, "for twenty centuries people who were not so well off as they would like to be have argued that there was something wrong with private ownership."

THE argument still goes on today, yet for some curious reason or other the vast bulk of all the property in the world is still in private hands. "We are asked to believe that the whole would has been wrong through all the ages and that there is a better way," says Sir Ernest, "the way of public ownership. It wants some courage in the face of the accumulated experience of mankind to carry on this old argument, but Socialists and Revolutionaries make up in courage what they lack in brains." A little later in his discussion of this subject he says: "Public ownership (therefore) acts as a discouragement to those invaluable citizens who are by nature makers of wealth, and encourages the incompetents, the parasites, the passengers, the incapables and the pauper-minded."

Our iconoclasts, who would destroy our image of these public services as benefactors, and contributors to our rapidly increasing standard of living, tell us that the light and power companies, for example, are agencies of the State and that their employees are quasi-public officials. They forget that these employees are helping to *create,* whereas public officials only *absorb.* They say that they are agencies of the State because the State leaves to them the performances of its functions. This is putting the cart before the horse. The electrical industry functions, primarily, in the interests of the public, just as government functions, in the interests of the public, and, for this reason, becomes automatically a quasi-public institution. Without the support of the public it must fail, just as government of any kind, without the support of the public, must fail.

These "destroyers of images" who spend so much of their time worrying about the electrical industry, set up the claim that either the industry must be run for the consumers or for the capital invested in it; it cannot be run in the interest of both. There is something about this idea that suggests the word "bosh." The industry is being run today in the interest of both, as is every other successful, progressive, *productive* business. They overlook the fact that it is the investor and not the consumer who provides the funds for the improvement of service, for the building of plants and the extension of lines (although probably two million or more of the twenty-three million consumers are also investors while the funds of other millions of consumers are invested in the industry through banks, insurance companies and other fiduciary agencies). For this money the electric light and power industry is always in competition with the luxury trades and with ordinary business enterprises, where quicker returns are afforded.

Unless it can continue to hold the confidence of the investing public, capital, always timid, will flow into other and less disturbed channels and the progressive electrification of home, farm and shop will come to a standstill. Such a contingency would, indeed, give rise to a possible crisis in our social, industrial and economic life, which would be quite as serious as any alleged crisis which these iconoclasts might set up.

Another criticism which is "played" from the place of departed spirits to breakfast by our iconoclasts, who look upon the light and power industry as the source of all evil, is that the industry hasn't sense enough to see that a reduction of rates to domestic consumers will encourage consumption. Oh, if these folks would only keep up with the times! If any group in the United States is preaching the reduction of rates to the domestic consumer in order to encourage consumption with greater enthusiasm than the electric industry, I have never heard of it. Take the speech by Matthew S. Sloan, president of the National Electric Light Association, made at the 52nd convention. It is highly illuminating, and I insist that the industry itself knows more about this phase of its business than any single individual, or group of individuals, whose contact with the industry must be, to say the least, slight. Mr. Sloan, by the way, is something of an iconoclast himself, but he is, above everything else, constructive. He may be a "destroyer of images" to such an extent that he sees clearly and not with smoked glasses, but he builds more enduring images to take the place of those which are false gods and which he brushes aside as ruthlessly as the Soviet Government of Russia brushes aside the rights of the individual—and he builds the new images first before destroying the old. His is true constructive iconoclasm.

Most of the material issued by the iconoclastic critics of the electrical industry is, if read by the unwary, of a nature which causes them to be bogged down in the quicksands of glittering generalizations and a phraseology filled with implications stated almost as though they were facts. This is particularly true with regard to what they call the "failure of government regulation." In order to prove this failure they become exceedingly provincial, and no iconoclast should be provincial. In naïve fashion they call attention to the failure of some particular commission to act just as they think it should have acted in some particular case, and ignore other work and decisions of the same commission, or of other commissions, which have been in the interest of the consumer. Because of their lack of belief in private ownership and operation in any form, no matter how well it may be controlled under existing laws, they would destroy the whole image of control by properly drafted public utility laws, properly administered by honest, efficient and experienced public officials. As in the case of the dog in Aesop's fable, they would throw away the substance in their tireless search for a shadow which appears to them to be of greater value.

> **"There is no truer test of a man's qualities for permanent success than the way he takes criticism. The little-minded man can't stand it. It pricks his egotism. He "craw-fishes." He makes excuses. Then, when he finds that excuses won't take the place of results, he sulks and pouts. It never occurs to him that he might profit from the experience."**
>
> THOMAS A. EDISON

THESE iconoclasts have new and untried schemes to offer. They suggest that the public utilities be controlled through the medium of contracts between the State and operating companies. These contracts, they claim, would supplement the present regulatory system, which, they say, is almost wholly derived from the police power of the State. The only interpretation which can be placed upon this idea is that the State, having found it impossible to exert its police powers, should try, by cajolery or intimidation, to force the operating company into the making of a contract which will make it possible for the State to really exert its police power. This is like saying that if a jewel thief, well known to the police of New York City, is forbidden by the police to go below Fulton Street, and is found somewhere on Maiden Lane, the police department should take the position that it cannot enforce its dictum and therefore must persuade the thief to enter into a contract in which he agrees not to go below Fulton Street. They also forget that much forgotten document, the Constitution of the United States, which provides that no one can enter into any contract which will deprive him of his constitutional rights.

There are so many other ideas which these iconoclasts put forward in their effort to establish an alleged fact that the system of production and distribution which has made the United States the most prosperous nation in the world is all wrong, that it is impossible to even list them. They are dissatisfied, of course, just as all iconoclasts are dissatisfied, but there are two kinds of dissatisfaction, just as there are two kinds of iconoclasts. The real menace which we are facing is that these people might possibly be able to sell to the public the idea that public authority can, and should, confiscate; with utter disregard of the basic principle that while public authority can "confiscate and own," it cannot "make." To replace with public ownership those valuable citizens who are, by nature, makers of wealth, is to destroy the results of all of our work during the past fifty years. We use dynamite to blast the way for the erection of a great structure. Iconoclasm, the destruction of images, is all very well if it is used intelligently and to prepare the way for structures greater than those which have gone before.

James H. McGraw Prize Paper

The Electric Water Heater

By H. GEO. D. NUTTING

TO those who are giving the subject much thought, the electric water heater is steadily forcing its way to the front as a revenue builder.

Its appeal for serious consideration lies principally in the following points.

1. It has a load factor higher than any other residence load now existent.
2. It has practically unity power factor.
3. It furnishes a class of service that is a necessity in the home—hot water.
4. It has a favorable diversity factor.
5. It is safer, cleaner and more convenient than any other method of heating water.
6. It is as economical to install as any other convenient method of heating water.
7. It is reasonably economical to operate and compares favorably with other methods giving the same service.
8. It lends itself favorably to off peak operation, if desirable.

In view of these advantages no utility manager can afford to ignore the importance of organizing his forces to market electric water heaters in his territory, at the present time.

It is difficult to obtain reliable statistics, but indications are that there are at least 20,000 electric water heaters in use in the United States today.

We have every reason to believe that the next few years will see more than this number installed each year.

But a short time ago the slogan was "An increase of a Kilowatt Hour a day in residences."

Here is a device that will average from five to twenty kilowatt hours a day.

Certainly such a device demands our earnest and serious attention.

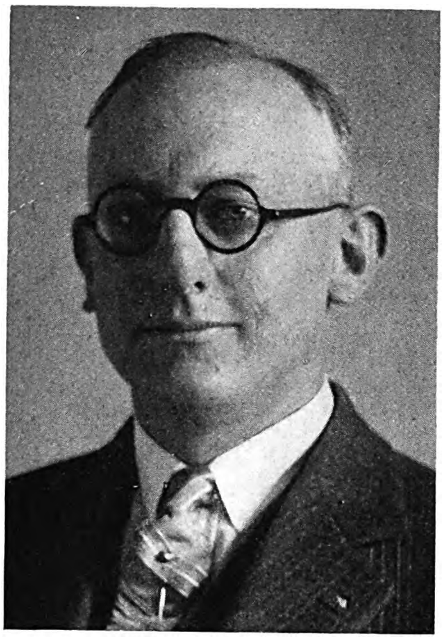
It is natural to inquire why the electric water heater is possible now whereas it was almost out of the question some years ago.

The answer lies principally in four reasons:

1. We have better heating elements now.
2. We have better thermostats.
3. We can make lower rates, due to operating economies and better average load factors.
4. The public standards of living are higher.

These reasons and some others have given us new views of this interesting load builder.

In this paper the writer will attempt to study the electric heater from all angles and offer an analysis which it is hoped will help central station managers to make decisions as to how to take advantage of the revenue producing possibilities of this appliance.



Mr. Nutting's paper won the 1928-29 James H. McGraw Second Prize Award He has been associated with the Detroit Edison Company as Power Sales Engineer for four years. A graduate of the University of Illinois in 1906, he has had wide experience since, as an engineer in both administrative and specialized work. He has also served in private practice as consulting engineer in rate cases and appraisals of public utilities and industrial plants.

The subject will be analyzed under the following heads:

1. What are the Customer's requirements?
2. What competitive methods are encountered?
3. What rates can the Utility make?
   (a) On Peak
   (b) Off Peak
4. What methods should be used in merchandising?
5. Descriptions of Heaters.

1—The Customer's Requirements.

Hot water is needed in almost every kind of a building—residences, apartment buildings, stores, golf clubs, garages, barber shops, factories, restaurants, doctors and dentists, office buildings, and so on ad infinitum.

The most inviting application, however, is the home. Any solution of the problem which satisfies the home requirements will automatically take care of nearly all other classes of customers.

In the home the amount of hot water needed usually depends upon:

(a) The number of persons in the family—particularly women and young babies.
(b) The number of bath rooms.
(c) The frequency of clothes washing.
(d) The frequency of bathing.
(e) Habits of waste and use.
(f) Standards of living.
(g) Differences in customs and temperatures in various localities.
(h) Miscellaneous uses.

Women use more hot water than men because they are usually more "finnicky" about cleanliness.

Young babies in the home are a source of large hot water requirements for both bathing and clothes washing.

A great difference exists between the standards of living of various families. Some folks are satisfied to turn on the hot water heater and wait an hour or two for hot water. Others want it "on tap" instantaneously. Some families take all their baths on Saturday nights, while others take them mornings or evenings throughout the week. Some folks want hot water under pressure only for bathing, and clothes-washing. Others want all their hot water "out of a faucet."

In some localities wash water is heated by servants over wood fires, while in others they use oil or gas exclusively. In many localities natural gas is available at low rates.

It is therefore evident that no general solution can be offered which will specifically apply to every locality and condition.

However, a large number of localities served by electric central stations will come within the points mentioned in this paper.

Experience with hot water heaters shows that the greatest requirements in the home come on wash day. On this day there is required the greatest quantity of hot water in the shortest space of time, i.e., the highest rate of flow or demand; also the highest temperature and the highest total quantity.

Any water heater that satisfies the requirements of wash day will usually easily satisfy the requirements of any other day.

In the ordinary family 30 to 50 gal. of water at 160 deg. Fahr., or higher, is needed to do the washing, and immediately after the washing is done there is likely to be at least one bath taken and sometimes two or three are taken.

These are the conditions that make it difficult to use low wattage heaters, in as much as their recuperation is comparatively slow.

Large storage tanks can be used but their heat losses, even when well insulated, are likely to be comparatively large. This condition is partially modified by the fact that a large tank can have a low wattage element and therefore operates at a good load factor. Such a heater will automatically earn a low rate, so that, in the last analysis, while the wattage losses may be high, the money losses may not be excessive. Actual examples of this will be given later.

From the customer's standpoint the ideal electric heater would probably be a high wattage instantaneous heater. To satisfy the demand for the speed of this day and age, a heater would have to be able to deliver about 3 gal. a minute, of 160 deg. water. Such a heater would be powered with 45 kw. A 15 kw. heater would give quite satisfactory service, but even this would introduce necessities for heavy entrance switches, wires, meters, etc., which make its use appear undesirable at the present time.

It is therefore necessary to compromise and use either large storage tanks with small electrical elements or small storage tanks with large electrical elements.

As between the two the writer believes that the comparatively small tank with the large element will furnish the most satisfactory service to the customer, but at a higher monthly bill than the small wattage heater, depending on the rate.

For example a 5 kw. element in an 18 gal. tank will give better service than a 1 kw. element in a 50 gal. tank. Also, at the same rate per kilowatt-hour, the 5 kw. heater will operate more economically, principally due to the lower heat losses through the insulation. The 5 kw. heater lends itself to manual or clock control and quick recuperation, thus making it unnecessary in many installations to maintain any high temperature water in storage. This affords an additional saving over the large storage type.

The larger element has the apparent disadvantage that it is usually necessary to increase the size of the entrance switch, when installing the heater, from a 30 ampere to a 60 ampere switch, and sometimes to even a 100 ampere switch. The change to a 60 ampere switch (from a 30 ampere) usually costs about $50, so that the overall cost of the heater installation is somewhat increased over the cost of the 1 kw. installation which will usually not exceed $10.

Some heater manufacturers sell the high wattage heaters at a higher price than the lower wattage heaters, and some sell the higher wattage at the lower price.

It is difficult, therefore, to make comparisons of first cost without knowing the make of heaters involved.

A discussion of the comparison of the demand and diversity factor of the two types of heaters will appear later.

Space saving, quick recuperation, lower cost of tank replacements, savings by virtue of manual or clock control, also are in favor of the high wattage, small tank heater. Costs of replacing burned out elements are against it.

The low wattage large storage tank heater lends itself better to off-peak operation, which, of course, does not apply to the high wattage small storage tank type. Off-peak operation and rates will be discussed more fully later.

An important consideration from the customer's standpoint is the point of installation of the heater in respect to the various plumbing fixtures in the house. Large losses result from drawing hot water through long bare pipes and leaving the pipes full of hot water which eventually turns cold thus losing the heat left in the pipes.

Water is usually drawn from kitchen faucets more *number of times* per day than from other fixtures. It is good practice, therefore, to install the heater as near as possible to the kitchen hot water faucet.

Hot water pipes should be thoroughly insulated when installed, preferably with not less than 2 in. thickness of asbestos-magnesia or air cell pipe covering. A heat trap should always be installed at the tank hot water outlet to stop local circulation in pipes.

Another good way to save heat is to have the electric heater provided with a two temperature thermostat. Clothes washing is the only process which requires water above 115 deg.-120 deg. The tank can be kept normally at this temperature until say the day before wash day, and the thermostat can then be turned to the 160 deg. point. Of course the objection can be raised that it may be forgotten, thus causing some inconvenience.

A very effective method of operation is by clock control. Users soon learn how long they need to allow a heater to run to get all the hot water they want for various purposes. This is a form of manual control, but with the advantage that the clock shuts the current off after a predetermined time interval has elapsed.

Heaters under water pressure having only manual control without clocks or thermostats are to be discouraged. There are cases on record where serious damage has resulted from accidentally leaving such unprotected heaters turned on.

Leaky faucets and careless waste of hot water by servants are problems which are sometimes difficult to solve. Some heater manufacturers provide rather clever devices to minimize these wastes. Spring faucets have been suggested and effectively used in many places to cut down waste. Their use is highly desirable.

After all the cost of operation of electric water heaters depends largely upon how much care and effort the user is willing to exercise to save electricity. This rule applies to any other method of heating water, but particularly to electric heating. Electricity has the advantage, however, that it lends itself to more easy control of the factors which make for economy than other methods of heating. It is easily turned on and off by simple switches after once having been properly wired.

Users who insist upon carrying a large storage tank full of 160 deg. water and maintain this temperature continuously close to the hot water faucets by means of circulating pipes, can expect to pay well for these conveniences.

Users who are willing to think a little in advance of their requirements and operate their heaters accordingly, can expect much lower hot water costs than those mentioned in the previous paragraph.

A novel scheme for saving current lies in the use of a heater with element and tank large enough for ordinary daily use, say 5 kw.—10 gal., but connected in parallel with the range boiler usually found in homes, attached to the furnace or house heating boiler. Between the two tanks, in the hot water pipe, is a valve which can be kept closed except when the need of a large quantity of water is anticipated for "wash day." Opening this valve will permit the whole range boiler to heat. After the washing is done the valve can be again closed and only the smaller tank used.

The writer has effectively used such an arrangement in his own home for some time.

No general figures can be given which will show the cost of heating water electrically. Manifestly the habits of use of the users control this.

It may be said, however, that average homes use from 150 kw-hr. to 500 kw-hr. a month, with an average for

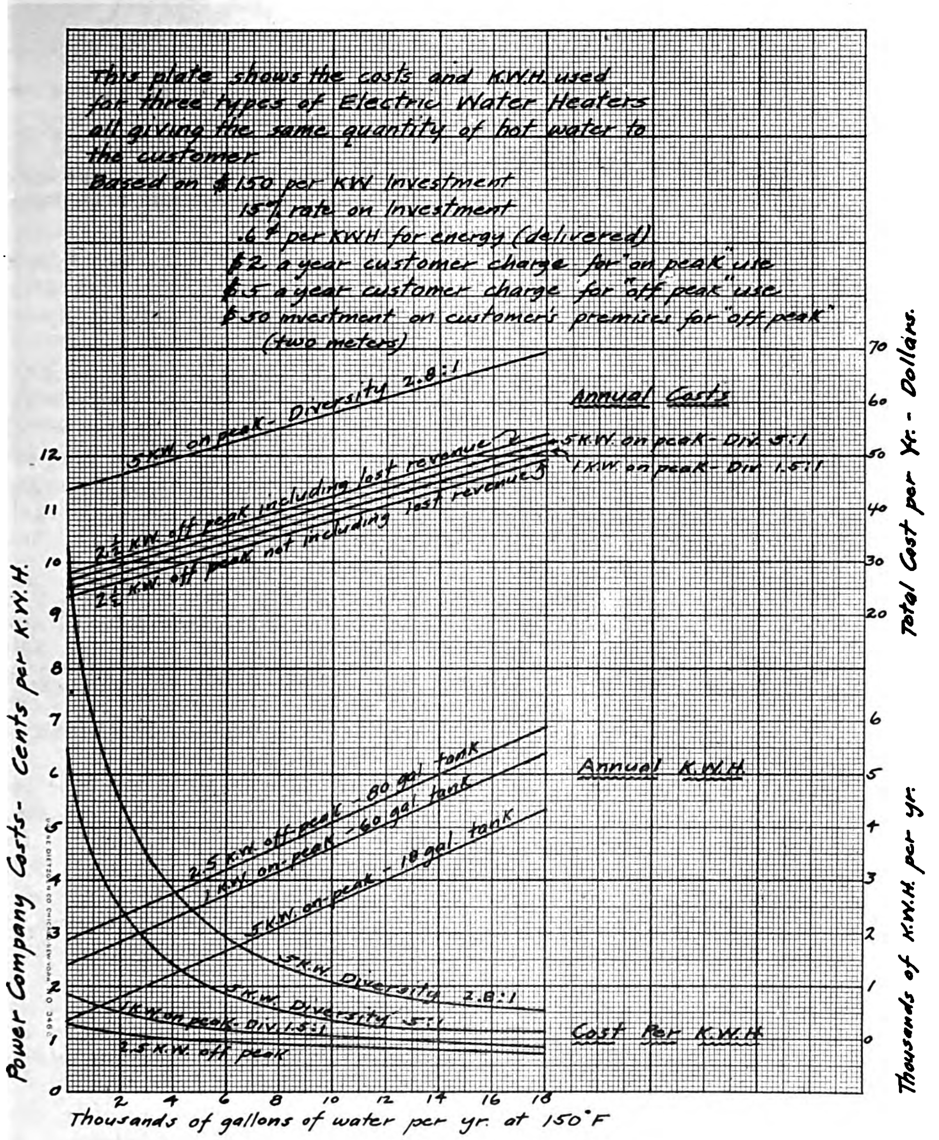


Chart 1

Costs and kw-hrs. used for three types of electric water heaters

summer use in the northern States around 200 to 400 kw-hr.

Some electric heaters are connected in series or in parallel with range boilers attached to house heating plants and continue to use a certain number of kilowatt hours all winter to supplement the heat furnished by the heating plant for hot water purposes. The range boiler also acts as a tempering tank in the summer-time.

For those who like statistics, the following figures are offered showing the use of hot water:

1. **Washing hands and face, shaving, etc., from a ½ gal. to 3 gal. at a time at a temperature of about 110 deg. Fahr.**
2. **Dishwashing, from 1½ to 5 gal. at 120 deg. to 130 deg.**
3. **Scrubbing, from 1 gal. to 5 gal. at 120 deg. to 130 deg.**
4. **Bathing, from 10 gal. to 30 gal. at 105 deg.**
5. **Clothes washing from 15 gal. to 50 gal. at 160 deg.**

These figures are very general, but will suffice to give some idea of the user's requirements.

The average family will use in the vicinity of 6000 to 10,000 gal. of hot water per year at 150 deg. Fahr.

Competitive Methods of Heating Water

It is hardly necessary to mention some of the old methods of heating water on cook stoves, or in range boilers attached to cook stoves by means of "water fronts" or "water backs." The cook stove "reservoir" was also quite popular 30 years ago.

The advent of the furnace or house heating boiler, usually installed in the basement, has also caused the unsightly range boiler to be moved to the basement.

Special coal fired or wood fired tank heaters have been installed for some years and more recently we have the gas fired heater, the fuel oil fired heater and the kerosene and gasoline heaters. Bottled gas and home gas plants, are now being offered.

In most cases the water is heated in winter by means of suitable coils and connections attached to the regular househeating boiler or furnace, leading to a 30 gal. range boiler, usually galvanized or of copper.

In some parts of the country it is necessary to use copper tanks and this also applies to tanks for electric heaters.

The greatest modern development has been in the use of city gas or natural gas for heating water. Gas heaters are now available, which are completely automatic, in both the instantaneous and storage types, and at prices within the reach of the average household. Well insulated tanks have contributed to economical operation. A comparatively recent design of heater is equipped with a low rate burner which uses only a small rate of flow of gas over long hours.

"Bottled gas" is now available for use in localities where more convenient forms of public service has not yet penetrated. This form of heat supply offers competition to electricity, the installation of which usually precedes that of city gas, in isolated communities.

The question is often asked—"How does the cost of heating water electrically compare with the various competitive methods?"

The answer is that none of these methods are really competitive. None can offer the three cardinal virtues of electricity, viz., safety, convenience and cleanliness.

The Electric Power Company's View Point. What Rates Can Be Charged. On Peak Or Off Peak

Most Power Company executives are much confused regarding electric water heaters. In the back of their heads they are not sure that electric heaters are sufficiently economical to recommend to their customers and they hesitate to make "promotional rates" for fear that they might promote too much business and turn present valleys into future peaks, with consequent increases in capital investment costs.

Further they can see no reason why they should make "class rates" to encourage this class of business. The writer is inclined to agree with this attitude. He believes that it is suicidal to pick out any particular appliance and make a special rate applying to it alone. A rate schedule should be so formed that appliances having high load factors, off peak maximum demands, and high power factors, will automatically earn a rate consistent with the cost of serving them.

In what follows the writer will attempt to make analyses intended to clear the atmosphere on the question of water heater rates.

It is now quite generally accepted that rates should adhere fairly closely to the cost of service of certain widely defined classes of service, namely:

Residence lighting and small appliances.
Small Power.
Large Power
Commercial Lighting.
Street Lighting.
And a few special classes like churches, water pumping, electric railway power, etc.

It is also generally agreed that the costs of service are made up of three main classifications of expense, namely:

1. Fixed (capital) costs.
2. Customer costs.
3. Kilowatt Hour costs.

Any attempt to go back over the theoretical calculations aiming at complete revisions of rate schedules, in this paper, would serve only to confuse the utility executive even more than he is already confused. It must be assumed that the present rates of most power companies are the results of developments based upon experience.

All we need to consider therefore is:

1. What rate will get the water heater business?
2. Will it be profitable to the utility?
3. In what form should it appear in the rate schedule?

1. *What rate will get the business?*

Of course no general answer can be given to this question for all parts of the country. In localities where 25c. natural gas is available the electric rate would need to be lower than in localities where only $2.00 city gas is available.

It is reasonable to expect, however, that the power company could in a measure take the same advantage of the low priced natural gas as the gas consumer could, although not to so great an advantage, due to the preponderance of fixed charges in the electric costs.

That low priced natural gas is not a controlling factor in selecting water heaters is proven by the fact that the American power company having the largest number of electric water heaters on their lines (over 6000 heaters), has put them on in the very face of natural gas competition (60c. gas). We understand the electric rate is 2c. a kilowatt hour, and that the average monthly bill for manually controlled heaters is $4.00.

The writer believes that a 2c. rate will get a very large volume of the available water heater business.

This of course means an "on-peak" rate, non-restricted as to connected load.

2. *Will water heater business at this rate be profitable to the Utility?*

This question invites an analysis of the basis structure of rates.

Let us assume that the total useful investment in a power utility is $350 per kw. of diversified demand. In other words, the useful investment divided by the peak demand is $350. It will be found to be somewhere near this figure in many well operated power companies.

Let us further assume that 15 per cent is a fair overhead charge for interest, depreciation, taxes, etc.

Then by simple arithmetic each kw. of demand on the system peak causes an annual fixed charge of 15 per cent of $350 equals $52.50. If a 1 kw. water heater is placed on the lines and its full demand comes on the system peak the company has to meet a fixed capital expense of $52.50 per year to serve it.

In addition to this fixed expense is the cost of energy, which of course varies in different places, but which we may assume for example to be 6/10c. per kw-hr. delivered at the customer's meter. Of course in some cases this will be 1c. or more.

Now let us assume that this customer will use 250 kw-hr. a month for six months out of the year and 100 kw-hr. a month for the other six months, all for water heating.

This amounts to 2100 kw-hr. a year, which at 6/10c. each will cost $12.60.

A further expense to the company will be the so-called "customer charge" which might add another $2 a year to the expense of service applicable to water heaters. (Note: Customer charges vary from $6 to $30. A good average would be about $15).

We then have a total of about $67 a year for 2100 kw-hr. or 3.2c. a kw-hr.

It should be noted that the above figures apply to only one 1 kw. heater placed on the lines. If a large number, say five hundred or more heaters, are put on, the diversity factor will be at least 1.5 to 1 and the demand charge per heater will be $35 instead of $52.50.

The over all yearly cost per heater will then be $49.60 or 2.36c. per kw-hr.

In order to definitely determine therefore what rate a given power company can profitably charge for water heating it is necessary to first determine:

1. What is the present and probable future investment cost per kw. of diversified demand?
2. What portion of this investment per kw. will be effected by increases in residence demand on system peak and on residence peak?
3. What is the diversity factor of electric water heating for both high wattage and low wattage installations?

In order to present to the reader a picture of the whole situation as to high or low wattage, and as to "on peak" or "off peak" rates an example will be given.

Let us assume we wish to install in an ordinary home with a family of four people an electric water heater to give automatic, continuous, reliable and satisfactory service.

For equivalent service to the family we have the option of installing, either—

1. A 1 kw. 60 gallon heater operating "on peak."
2. A 5 kw. 18 gallon heater operating "on peak."
3. A 2½ kw. 80 gallon heater operating "off peak" (assume the off peak period is 10 hours).

Which heater will give the lowest cost per month to the customer and what profitable rate must the power company charge in each case?

Assume the use of hot water is 2000 gal. a month at an average temperature of 150 deg., and that the electric heater furnishes all the hot water for six months and half of it for six months. First let us study the 1 kw., 60 gal. heater, which it is assumed will come on the system peak.

Experience and tests show that this heater will use 560 kw-hr. a month for the 2000 gal. a month period and 340 kw-hr. a month during the 1000 gal. a month period. (Note that the losses are figured at an average of 120 kw-hr. a month during both periods).

Information available at this time indicates that connected loads of 1 kw. will give a diversity of 1.5 to 1. In other words the summation of say 500 one kilowatt loads will give a peak demand of 500 divided by 1.5 equals 333 kw. and one kw. will contribute .67 kw. to the system peak demand. There is not sufficient data at hand to absolutely prove this figure, but for purposes of example the reader is asked to accept it for the time being.

The power company's cost of service will then be calculated as follows:

The increased investment in power house, and including some distribution capacity, will be about $150 per kw. of diversified peak demand. (See discussion of this figure later). The annual fixed charges will then be (for 1 kw. heater)—

$150 × 15% × .67 kw. = ...$15.05
The annual kw-hr. charge will be
6 Mo. @ 560 kw-hr. = 3360 kw-hr.
6 Mo. @ 340 kw-hr. = 2040 kw-hr.

Total for year = 5400 kw-hr.
@ 6/10c.. 32.40
Annual customer charge (assuming heater is connected on regular lighting meter), say............ 2.00

Total annual cost of service........$49.45
Average cost per month.......... 4.12
Average company cost per kw-hr.

$$\frac{\$49.45}{5400 \text{ kw-hr.}} = 915\text{c.}$$

Annual load factor based on connected load =

$$\frac{\text{kw-hr. used}}{\text{kw-hr. connected}} = \frac{5400}{1 \times 8760} = 61.7\%$$

Annual load factor based on maximum demand =

$$\frac{5400}{.67 \times 8760} = 92.2\%$$

Now let us calculate the cost of

serving a 5 kw.-18 gal. heater, giving the same service.

Preliminary tests made by the Detroit Edison Company indicate that the diversity of "high-wattage" heaters, based on the Monday peak, is 2.8 to 1.

The tests are not final but are based upon the measured observation of 4 heaters for 17 Mondays, and it is believed that further tests will show even better diversity than 2.8 to 1. For the purposes of our analysis we may assume that this diversity factor is reasonably correct.

The cost of service for this heater giving the same service as the aforementioned 1 kw. heater will be calculated as follows:

Fixed charges: (annual)

$$\$150 \times 15\% \times \frac{5\text{ kw.}}{2.8} = \$40.20$$

Energy charges:

Less kw-hr. will be used than for the 60 gal. tank because the tank losses of this 18 gal. tank will not exceed 35 kw-hr. a month compared to 120 kw-hr. a month for the 60 gal. unit. The total kw-hr. per year for this heater will be:

Useful heat in water
18,000 gal. × .22 kw-hr. = . . . 3960 kw-hr.
Losses 12 mo. × 35 kw-hr. = . . . 420 kw-hr.

Total kw-hr. per year = ... 4380 kw-hr.
@ 6/10c. = $26.28
Customer charge 2.00

Total annual cost of service $68.48
Average cost per month 5.71
Average cost per kw-hr. 1.56
Annual load factor based on connected load

$$\frac{4380}{5 \times 8760} = 10\%$$

Annual load factor based on individual heater's contribution to the system peak =

$$\frac{4380}{\frac{5 \times 8760}{2.8}} = 28.1\%$$

Now let us see what the cost of service of the 2 1/2 kw.-80 gal. heater is, when operated "off peak."

It is necessary to power this heater with a 2 1/2 kw. element to be sure that it will completely regenerate in the off peak time usually available (about 10 hr.). It takes 2 kd. per hour for 10 hr. to regenerate 80 gal.—100 deg. temperature rise, so this 2 1/2 kw. element leaves 1/2 kw. capacity to spare.

Investigation of the power house capacity released for 10 hr. (off peak) in one power company revealed the fact that about 30 per cent of the residence customers could be equipped with these 2 1/2 kw. heaters without making any investment whatever in increased facilities to serve them. The writer believes it is safe to assume that this type of heater need never be charged with fixed capital charges so far as plant equipment is concerned, except, possibly, for "class responsibility." This type does, however, introduce an element of fixed charges in control and metering equipment.

It requires a reliable control clock and an extra meter, and the installation, care and maintenance of this equipment. (Note: In certain types of rate schedules the special meter can be avoided).

The clock should be an electrical wound-spring operated clock so that it would not have to be wound by hand, and also so that power interruptions would not necessitate resetting. Clocks of this type are available for both A.C. and D.C. current.

Where a large number of heaters are installed it is now possible to use a form of "Resonant Control" which has been developed by the Westinghouse Company. This control scheme uses the regular power wires for conducting the control energy. It requires quite elaborate equipment at the sending end, but only a comparative simple relay (costing about $45), at the receiving end. No vacuum tubes are necessary, and it is claimed that the system is reliable. This system seems to offer possibilities for the future.

However, for the present, we shall confine ourselves to the clock control. To install a good clock and meter will cost in the vicinity of $50.

Our cost of service per year will then be as follows (for off peak service):

Fixed Charges:
15% of $50.00 . . . . $ 7.50
Kw-hr. Charges:

More kw-hr. will be used than by either of the previous methods. The losses of the 80 gal. tank will be about 160 kw-hr. a month. The annual kw-hr. will therefore be:

Useful heat in the water—
18,000 gal. × .22 . . . . . 3960 kw-hr.
Losses 160 × 12 . . . . 1920 "
"
Total Annual kw-hr. . . 5880 "
Annual kw-hr. cost is 5880 kw-hr.
@ 6/10c. = ... 35.28
Customer Charge:

This will be higher than for the other types because of the cost of maintenance of the clock and meter and because of the necessity for extra billing, etc. The writer believes this item should be about $5.00

Total Cost of Service 47.78
Average Cost per Month 3.98
Average Cost per Kw-hr. 812
Annual load factor based on connected load =

$$\frac{5880}{2.5 \times 8760} = 26.8\%$$

Annual load factor based on diversified maximum demand (assuming diversity factor 2 to 1)

$$\frac{5880}{\frac{2.5 \times 8760}{2}} = 53.6\%$$

A very important consideration in connection with this off peak installation is this:

A low rate cannot be advisedly made to apply to water heaters only, without permitting all other "connected" load to be thrown onto the "off peak" meter, during the off peak period.

This "other connected load" is, in most power companies, now paying rates, possibly in the vicinity of 4c. or higher. If it is permitted to be thrown over onto the off-peak meter, manifestly the power company will suffer some considerable loss in revenue due to this large cut in rate for a portion of its present load. This reduction in revenue would have to be charged against the off peak water heater rate, so that it would make it considerably higher than the on peak low-wattage heater rate.

The writer believes that there should be some general adjustment in rates giving the customer the benefit of the "off peak" cost reduction experienced by the power company, but it should come from an analysis of all the factors effecting off peak operation, not from water heaters alone.

Referring to the above calculations it will be noted that the fixed charges are an important element in the cost.

The gallonage figures used (18,000 gal. a year) are probably larger than would be required by the average residence. In places where the use is half this amount the annual kw-hr. used will be nearly proportionately low and the rate per kw.-hr. wlil be doublel.

For example suppose we study the 1 kw., 60 gal. heater from this standpoint, assuming a use of 9000 gal. of hot water per year, instead of 18,000 gal.:

Fixed Charges $15.05
Kw-hr. Charges:
9,000 gal × .22
kw-hr. = 1980 kw-hr. (useful)
12 mo. × 120
kw-hr. = 1440 kw-hr. (losses)

Total . . . . . . = 3420 kw-hr. @
6/10c. = 20.52
Customer Charges 2.00

Total Annual Service Cost $37.57
Average Monthly Cost 3.13

$$\text{Average Cost per kw-hr.} = \frac{37.57}{3420} = 1.1\text{c.}$$

Annual Load Factor based on maximum demand =

$$\frac{3420}{.67 \times 8760} = 58.2\%$$

In order to show the effect of water use load factor on the rate for the full range of load factor Chart I (page 643) has been calculated. It will be noted on the "Cost per Kw-hr. Curves" in Chart I that at low load factor, low wattage is desirable, but at higher load factors the annual cost is about equal for high and low wattage and off peak.

Also note that, if the "lost revenue increment" above referred to for "off peak" service is added to the "off peak" costs the 1 kw. "on peak" heater will show lower yearly bills than the "off peak" heater, as shown by the following calculation:

If it is assumed that one-third of the average customer's present normal annual kw-hr. use is reduced 2c. a kw-hr. by throwing it on the off peak meter this means an annual loss of, say, 240 kw-hr. times 2c. equals $4.80. Add this $4.80 to the "off peak" heater annual costs and it will be seen by reference to Chart I, that the customer's annual bills for the "off peak" heater, exceed those of the 1 kw. "on peak" heater. The rate per kw-hr. will then be about the same as for the 1 kw. "on peak" heater.

Attention is called to the fact that in the previous discussions we have referred to Power Company *Cost* figures and their effect on customers' bills, if they were also *rates*. The next question is:

What should the *rates* be and how should they be stated in the rate schedule?

On account of many contingencies and uncertainties it would not be wise to offer the exact costs developed in the foregoing discussion in the rate schedule. An addition of from 10 per cent to 20 per cent all along the line is advisable. For example, an addition of 20 per cent to the cost per kw-hr. shown on Chart I, for the 1 kw-hr. heater heating 10,000 gal. a year, would give a rate of 1.1c. times 1.2 equal 1.32c. per kw-hr.

For the same use the 5 kw. heater rate would be 2.1c. times 1.2 equal 2.52c. per kw-hr.

The customer's annual bill for the 1 kw. heater would be 1.32c. times 3650 kw-hr. equals $41.70 ($3.47 a mo.) and for the 5 kw. heater 2.52c. times 2600 kw-hr. equals $65.60 ($5.47 a mo.).

The rate schedule problem presented by an inspection of the cost curves shown in Chart I is no new problem. It simply again shows the load factor as the important element of the cost of service.

So far as the 1 kw. heater is concerned a flat 1 1/2c. rate could be added as a step in the residence rate schedule at a point beyond, say, 100 hr. use of the present demand. With some Power Companies this might be as low as 60 hr. use and with others it might run up to 150 hr. use, of the demand.

The principal difficulty is in finding a way to curtail the use of 5 kw. heaters at low load factor or charge them a proper rate if they are used. Inasmuch as the water heater alone is likely to be the appliance that both demands and affords the opportunity for the low step in the rate after about 100 hrs. use of the demand in residences, the following forms of rate schedule are suggested.

When the load factor type of rate is used a schedule might read:

10 c. per kw-hr. for the first step.
6 c. per kw-hr. for the second step.
3 c. per kw-hr. for use over the first and second steps where no heater or where a 4 kw. or 5 kw. water heater is installed or,
2¼c. per kw-hr. for all over the first and second steps where a 2 kw. or 3 kw. water heater is installed, or
1½c. per kw-hr. for all over the first and second steps where less than 2 kw. water heater is installed.

Manifestly this calls for service inspection; but it is believed that few water heaters will be installed without the Power Company's knowledge inasmuch as customers usually inquire of the Power Company before they install a water heater. Further, this rate is arranged so that the Power Company receives the highest third step until its attention is called to the fact that a customer has less than a 4 kw. or 5 kw. heater. The first or second monthly bill will usually suffice to direct attention to the element capacity of the water heater.

The "steps" above referred to may be based upon hours use of active load, number of rooms, area or any other basis already adopted by the Power Company. Where it is desired to put the water heater on a separate meter (on peak) and make a special rate, the above mentioned third step rates plus ¼ cent per kw-hr. for extra customer charges will cover.

Before leaving this phase of the subject the reader is reminded that the above rate figures are based on the following constants:

$150 investment per diversified kw. on the system peak.
15% of the above $150 for annual capital charge.
6/10c. per kw-hr. delivered at the customers' meter.
$2.00 per customer per year for operating overhead.

In those companies where these constants are different, the rates should be adjusted accordingly.

Discussion of Investment Per Diversified Kw. of Demand

$150 per kw. has been used for this constant. Can this be justified?

Early in this paper a figure of $350 per kw. was given for total investment per diversified kw. of system peak. This $350 is made up as follows:

Power Houses and equipment	$110 per kw.
Transmission lines and substations	$110 per kw.
Distribution system feeders and net work, including transformers and customers' services	$100 per kw.
Office Building utility equipment, warehouse and misc.	$ 30 per kw.
Total	$350 per kw.

So far as the Power Houses are concerned it is evident that any water heaters placed on the lines must stand their full share of system peak responsibility at the rate of $110 per diversified kw. of Demand. There is, however, some question as to how much responsibility they must stand in respect to transmission lines, substation, feeders, net work and distribution transformers.

Investigations and analyses made by the writer show that a great difference exists in the ratios of the capacities to present peak demands on the various substations of power companies. Some substations are very much underloaded and some are overloaded. Similarly with feeders and net work distribution systems, some are working below capacity and some over capacity.

Distribution transformers are generally loaded up to their working capacity. Without having any definite figures to support the statement, but basing it upon conferences with the Engineering Department of The Detroit Edison Company, it appears that on a whole this outside equipment is about two-thirds loaded.

This means that the average 10,000 kw. substation has about 3333 kw. still unloaded, and ready for future development. This same figure will generally apply to the feeders and net work emanating from the substation.

Assuming that such a substation and net work will have connected about 5000 residence customers who might put in electric water heaters of 1 kw. capacity each, the increased load on the substation and net work peak would be $0.67 \times 5000 = 3350$ kw. (0.67 being the diversity factor for 1 kw. heaters). In other words all of the residences on a given system could be supplied with 1 kw. electric water heaters without increasing the investment in substations or net work, except possibly in service transformers.

However, this does not say that the water heaters should have a "free ride" —but rather that, if we are to make sound rates, they must absorb their share of the total capital investment costs. These investment costs should be prorated on a basis of the on peak class responsibility (or equity factor) of each class of residence service, which on the average will be as follows:

(Note that these are diversified simultaneous demands)

Lighting	.20 kw.
Refrigeration and Misc.	.25 kw.
Range	.55 kw.
Water Heater (1 kw. element)	.67 kw.
Total	1.67 kw.

The water heaters' proportion will be

$$\frac{.67}{1.67} = 40.8\%$$

Therefore if the water heater takes its full responsibility for all the investment outside of the power house the annual capital charges per kw. against it will be 40.8 per cent of the investment in transmission lines, substations, feeders and net work per kw. of total diversified residence maximum demand. Note that the residence maximum demand probably does not come on the system maximum demand. For example, in the writer's company the system peak comes at 10 a.m. and the residence peak at 7 p.m.

As previously shown, for one company, the investment outside of the power-house in transmission lines, substations, distribution systems, and all other miscellaneous investment is $240 per kw. of system peak.

All of this investment is not, of course, used in serving residence customers.

So far as the writer knows there is no generally accepted method of determining what proportion of it is applicable to residence service.

This entire part of the investment is used for power and other classes of service besides residence service. The commercial power and residence service peaks do not superimpose.

It is permissible, therefore, to use an arbitrary figure on this, and the writer has assumed that, out of the $240 per kw. above referred to, $100 per kw. is the investment chargeable to residence service for the purposes of this analyses.

Taking the class responsibility or factor of equity as 40.8 per cent, the annual proportional investment cost per kw. of system peak chargeable to water heaters is $40.80.

Adding this to the power house investment cost ($110 a kw.) the total investment cost chargeable to water heaters will then be about $150 per kw. of system peak.

Importance of Diversity Factor

In all of the foregoing calculations it has been assumed that the system peak comes on wash day and that the diversity factor of the 1 kw. low wattage heaters is 1.5 to 1 and of the 5 kw. high wattage heaters 2.8 to 1. If the system peak comes some other day than wash day, and it usually does, the diversity factor of the 5 kw. heaters can be close to 5 to 1. The cost of service per kw-hr. annual kw-hr. and customer's annual bill are also shown on Chart I for this 5 to 1 diversity.

The basic calculations for one point on the curve are as follows:

Fixed Costs

$$\$150 \times 15\% \times \frac{5\text{ kw.}}{5} = \$22.50$$

Energy Costs for 18,000 gal. a year
4380 kw-hr. @ 6/10c. = ...$26.28
Customer Costs ....$ 2.00

Total Annual Costs $50.78

$$\text{Cost per kw-hr.} = \frac{50.78}{4380} = 1.16\text{c.}$$

Inspection of the curves (Chart I) shows this cost to still be higher than for the low wattage heater but only slightly so.

Merchandising Electric Water Heaters

The merchandising of water heaters is different than that of all other appliances, including the range. However, it is the same as the range in that with it must go a certain amount of education of the customer.

An automatic water heater does not demand the attention to economy that a range does. A range is continually subject to loss of economy through various acts of ignorance and carelessness of the operator, while the water heater economy can suffer only through unnecessary waste of hot water.

The most important element in the attempt to sell electric water heaters is a person at the head of the organization who uses an electric water heater in his own home and who has practical knowledge of how they are built and how they are piped and wired up. If the Power Company is a large one he should have trained assistants in all the branch offices so that confident, intelligent and reliable information can be given, to customers. Ordinarily until a company gets its heater sales well established, they should be placed in the hands of the Power Sales Division, rather than in the merchandising department.

When a customer is interested in a water heater, an inspection should be made of his premises and he should be advised as to the practicability of instaling the heater, how it will be piped and wired, how much the heater will cost him, how much it will probably cost him to operate it, how long it will last, what chance there is of the elements burning out and what it will cost to replace the elements. Any attempt to fool the customer on any of these points will act like a boomerang sooner or later.

If local plumbers and electrical contractors or other individuals, also sell heaters they should be instructed on the above points, and checked to see that they give the customer correct and honest information, for, eventually the come-back is on the power company.

In the writer's opinion water heaters should be sold to a Power Company's customers only by the Power Company and at a price high enough above cost to carry the water heater sales, and no higher. It is a Power Company's duty and obligation to place in the hands of it's customers all the electrical appliances available and wanted by it's customers at as low a price as can be reasonably made, and then to furnish service at the lowest price which yields a fair profit.

Sales promotion methods should be carried on with water heaters in the same manner as with all other appliances. These methods are too well known to need repeating in this paper. Every heater should be sold on a "money back guarantee" to furnish the service claimed for it.

Description of Commercial Water Heaters

There are at this time about twenty-five manufacturers of Electric Water Heaters in the United States. A number of variations in design and construction are offered, descriptions of which can be found in manufacturers' catalogs. Lists of these manufacturers can be obtained from the McGraw Publishing Company, publishers of the *Electrical World*.

An ideal electric water heater should have the following specifications:

1. It must be mechanically well built.
2. It must have an element that will not easily burn out or scale up.
3. The element must be easily removed for cleaning or replacement, preferably without turning off the water or disturbing the insulation.
4. It must be arranged so that scale and sludge can be conveniently removed from the tank and pipes.
5. It must have a reliable thermostat that will not get out of order for at least four or five years. The thermostat should be adjustable to operate at 120 deg. or 160 deg. but it should not be differentially adjustable.
6. It must be thoroughly insulated with a non-inflammable material at least as good an insulator as three inches thickness of hair felt, and of a nature to prevent condensation on the outside of the tank.
7. It must be well finished on the outside of the insulation covering with a material that looks well and prevents rusting and corrosion.
8. It must be arranged so that it can be conveniently installed with manual or clock control.

There are a number of heaters on the market that meet these specifications at least in part. A few manufacturers offer heaters with two or three elements differentially controlled. For example a heater may have 3-1500 watt elements only one of which is turned on a large proportion of the time. Claims are made that this is an advantage. In the writer's opinion it is a positive disadvantage.

It was pointed out in the foregoing discussion that the only time that the question of the electrical demand of the heater needs to be considered in the cost of service is on wash day, which usually is Monday morning. At that time all the capacity of a heater, and in fact of all the heaters where washing is being done, is needed at about the same time. Any curtailment of the use of the electrical capacity at that time is a loss to the customer. If this heater peak comes on the system peak this one day a week, plant capacity has to be provided for it

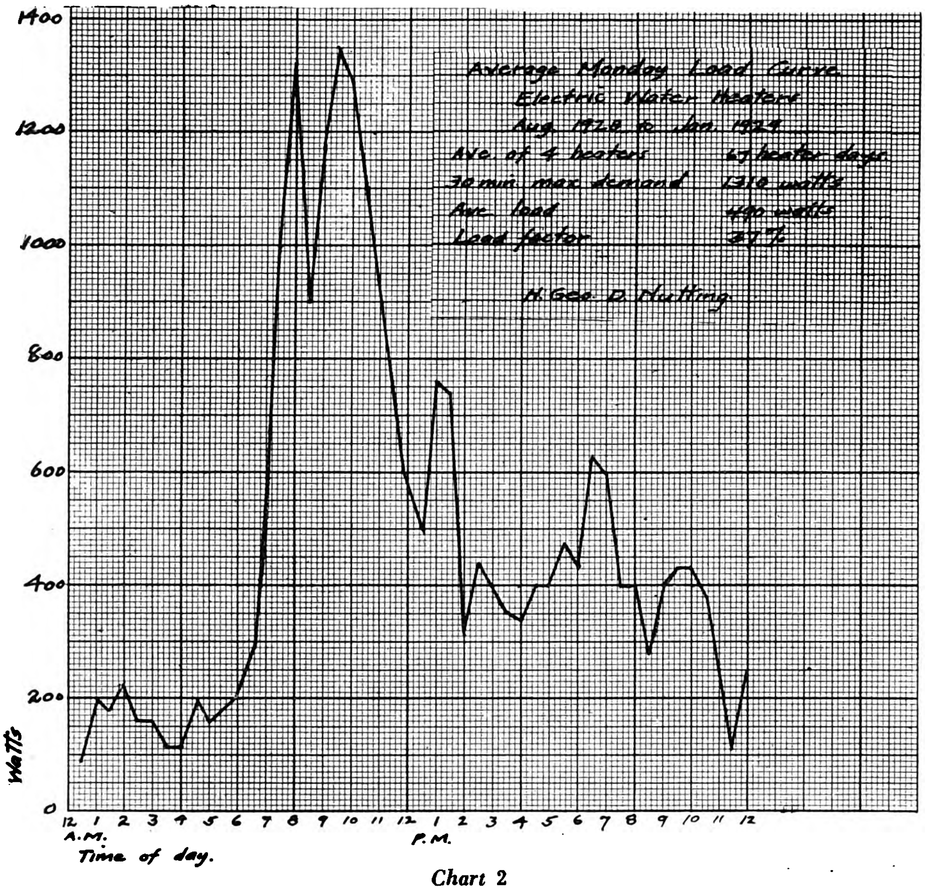


Chart 2

Average Monday Load Curve

regardless of the load on other days. The fact that only one third of the elements are on the rest of the week means nothing. It is like a man being dead—he can't be "any deader." This divided "on and off" feature is a benefit so far as flickering lights are concerned but its value does not justify any extra cost to make it available.

Similarly some manufacturers claim as an advantage a uniform temperature in the tank. In the writer's opinion arrangement of the element to give a high temperature quickly at the top of the tank is a distinct advantage over having a low uniform temperature. One gallon of hot water at 160 deg. is usually better than four gallons at 85 deg. although in both cases there are the same number of B.t.u. in the water. In other words what is wanted is not slow recuperation of a whole tank of water but fast recuperation of a comparatively small quantity, with eventual recuperation of the entire tank.

All sorts of methods for making and applying the heating elements are in use. One manufacturer places the elements in porcelain blocks around the outside of the tank and places the insulation over these blocks. He uses 4 in. thick of asbestos aircell insulation. In this design the heat gradient through the insulation is much larger than it is for heaters with the elements immersed in the water. On the other hand the distribution of the elements around the tank makes for a low heat dissipation per square inch into the water and holds down scale. This manufacturer claims they have never had to replace a burned out element. The elements are connected in series-multiple so that a burn out of one element would not be serious and probably would not even be discovered. This heater is controlled by means of a bimetal thermostat operating a magnetic relay which is claimed to be non-chattering. The writer has inspected a number of these heaters in service and has found them to be giving satisfaction.

A number of other heaters are made in the form of fire tube boilers, with the heating elements within the tubes. Several manufacturers claim to have patents on this arrangement. The elements are sometimes made by a chromium-nickel-steel alloy imbedded in a conductive electrical insulating cement, all encased in metal, and sometimes by winding an alloy element into spring like coil, placing it on a grooved lavite or porcelain tube and surrounding the whole thing by a copper or brass tube. Both of these types of elements are giving good service.

A common type of element is the so-called immersion element which is usually made of the alloy imbedded in the insulating cement under a heavy pressure, and the "blades" covered with copper sheaths. A common method of using the immersion element is in side-arm circulating heaters. This type of

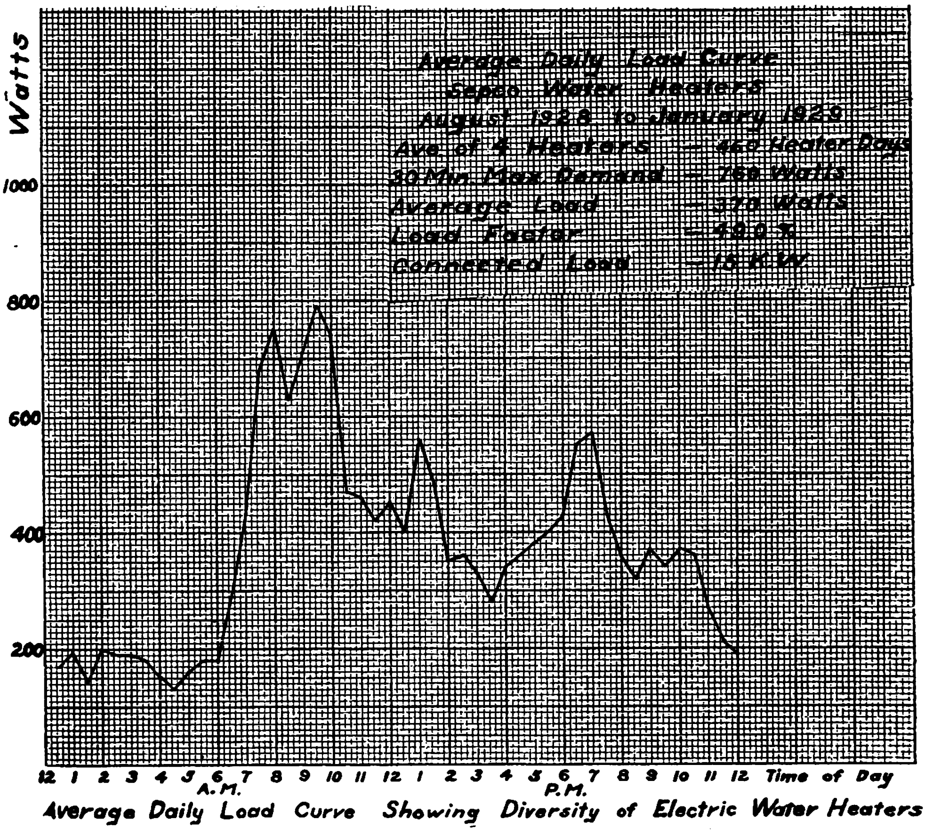


Chart 3

Average Daily Load Curve

heater has got into ill repute for reasons independent of the application of the sidearm. There is no reason why a side arm heater can not be as efficient as any other heater, and it has the advantage mentioned before that it delivers a small quantity of very hot water to the top of the tank quickly.

In installing heaters of this type care must be exercised to keep the element covered with water when the electricity is on, otherwise it might burn out. As a protection against this, the drain cock of the tank should be at a level above the top of the element and the balance of the connections so arranged that it is necessary to take the element out to completely drain the tank.

Some water heaters are made by immersing the uninsulated alloy wire heating element directly in the water. In some cases this has been successful, especially where a large surface of the element is used and the watts per square inch is low. The tendency usually is for the scale to collect on the element, thus raising the temperature gradient and eventually burning out the element.

One modification of this scheme is a heater immersed in water that has the scale forming matter "burned out" of it and arranged so that very little "raw water" gets into the element chamber. At first it was feared that these "direct contact" types of heaters were dangerous, but with modern methods of grounding this is not the case. At least information is that they have been approved by the National Board of Fire Underwriters.

Water rheostat types of heaters have been tried and found fairly successful. However, they have the disadvantage that the electrodes soon scale up and gradually reduce their capacity. The necessity for safe grounding is very urgent in this type of heater. Arc element heaters are offered and operate successfully.

A heater recently announced is operated by means of a low voltage-high amperage current from a transformer in the base of the heater. The secondary of the transformer is made of pipe and the water passes through this pipe thus becoming heated. The ends of the pipe secondary are short circuited through the bottom plate of the heater. This heater appears to be expensive to build but its design permits of low wattage per square inch heat dissipation, and therefore, should be good for hard waters.

Insulation

All kinds of insulations are used in electric water heaters. Those most commonly used are mineral or rock wool, cork, hair felt, balsam wool, asbestos air cell, asbestos magnesia and dead air space. Regardless of what is used, a thickness of at least 3 in. is required. Some heaters use 4 in. In all cases the insulation must be held firmly in place by an outside covering, which also must be attached firmly to the water tank itself.

All electric heaters should be equipped with manometer type heat traps with the hot leg preferably buried in the insulation. Every constructional advantage should be taken to save heat. Of the above insulation dead air space is the most to be desired if it really can be made dead. Mineral wool is cheap, and non-inflammable, and among the best from a standpoint of insulating value. Cork is very satisfactory, but not quite so inflammable as mineral wool. Hair felt has a very high insulating value but is inflammable. It is said that it also sometimes gets wormy after being in service for some time. The writer has never seen any cases of this worminess. There is still much to be desired in the way of insulations. Schemes along the line of the Thermos Bottle doubtless will be eventually developed.

Thermostats

Following are the types of Electric Water Heater Controls now available:

1. Bimetal strip (straight or coiled or helix) with relay contactor.
2. Bimetal coil or helix operating tipping mercury tube.
3. Bimetal coil or strip or helix displacing mercury with a piston.
4. Sylphon Bellows tipping mercury tube.
5. Sylphon Bellows making electrical contact, and operating relay contactor.
6. Sylphon Bellows operating mechanical quick break switch.
7. Spencer disc carrying quick break contacts.
8. Mercury thermometer with platinum contacting wire cemented into glass, operating relay contactor.
9. Mercury bulb making electrical contact which operates relay contactor. Electrical contact may be remote from bulb at end of flexible tube.
10. Mercury bulb operating mechanical quick break switch.
11. Expanding rod operating mechanical quick break switch.
12. Expanding rod operating relay contactor.
13. Expanding rod operating tipping mercury tube.
14. Vapor bulb and Bourdon tube—mechanical breaks.

Recent Prime Movers Committee Reports

Attention is called to recently published reports of the Prime Movers Committee which will be reviewed in the November issue of the BULLETIN.

These reports are:

Power Station Chemistry Part II—which is a report of the Chemists' subcommittee and includes a non-technical review of water treatment for steam generation; Condensing Equipment, being a study of performance records of single-pass and 2-pass condensers; and Turbines. This report presents a summary of the 1926 record of 153 turbines, 1927 record of 186 turbines and the detail 1928 record of 207 turbines. Tests on turbo-generator units ranging in capacity from 6000 to 60,000 kw. are included.

Of the above those principally used are the (a) Spencer Disc which is made and controlled (for water heating application) by the Westinghouse Company; (b) bimetal strips or coils operating relays or mercury tubes; (c) vapor bulb operating mercury tube or mechanical make and break contacts. (d) Sylphon bellows operating quick break contacts or tipping mercury tubes; (e) expanding rods or tubes operating mechanical quick break contacts or mercury tubes.

Practically all of the thermostats now in use are working quite satisfactorily. All have their benefits and their detriments and but few of the old troubles of dirty contacts, arcing and cementing, chattering of relays and total failure are now experienced. The improvement in thermostats has had a great influence in the development of the electric water heater.

The oil burner and the automatic gas heater have had much to do with forcing the development of thermostats. Without thermastatic control the electric water heater is impractical and dangerous. Some trouble is being experienced in getting suitable thermostats to operate on direct current, particularly in the higher wattages, but this can be effectively done at a little higher cost than with alternating current.

Conclusion

The writer has attempted to place before those interested a compilation of theoretical and practical experience with electric water heaters. Within the range of his own experience the data offered is accurate. No attempt has been made to cover all of the ground but rather to give the reader enough information to interest him in starting investigations of his own, to the end that the electric water heater may come into it's own as a central station revenue producer and as a service to the public.

The writer does not wish to convey the idea that this paper is the "last word" in water heating practice, but hopes that it will stimulate further thought, experimentation and discussion on this subject.

The author is indebted to Harry A. Snow, assistant controller of The Detroit Edison Company and Norman Wilcox, chairman of the N. E. L. A. Water Heater Committee for helpful suggestions. However, the writer's conclusions are not to be interpreted as their conclusions, or those of their companies.

Another Anniversary

The Opening of the Pearl Street Station in New York

By JOHN W. LIEB

Senior Vice-President, New York Edison Company

ON September 4, 1882—there occurred in New York City an event of epoch-making importance in the history of human progress.

On that day there was put into regular service a central electric power plant, at 257 Pearl Street, for the general house-to-house distribution of electricity through underground conductors for light and power purposes throughout a considerable section of the City, extending from Wall Street to Spruce and Ferry on the north and from Nassau Street on the west to the East River.

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By the last day of December, 1879, sufficient progress had already been made in the commercial development of his lamps to undertake a public exhibition on a considerable scale at Menlo Park, in the presence of thousands of visitors.

With the facilities for the product of the lamps on a commercial scale, exploitation of the Edison System of Electric Lighting was energetically promoted.

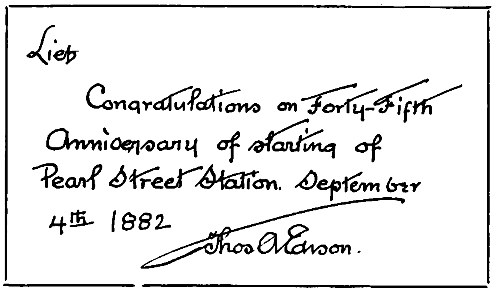
Private generating plants were installed in 1881, in a number of private houses in New York, among others in the residences of Messrs. Morgan, Vanderbilt and J. Hood Wright, and in a number of stores and factories—the very first being the printing establishment of Hinds Ketcham & Company, followed by E. S. Jaffray & Company, the New York Post Office and the New York *Herald*.

It remained, however, for the old Pearl Street Station to provide a complete demonstration of the commercial practicability and economic feasibility of the Edison System of Electric Lighting and convince the most skeptical that the problem of the generation and distribution of the electric current through a complete underground system to thousands of lamps located in many buildings throughout a considerable area had been completely solved.

WE have mentioned the development of the incandescent lamp—the keystone of this great enterprise—which, having been accomplished, Edison rounded out with one invention after another in rapid succession, all of the many elements necessary to the perfection of a complete commercial lighting system.

He developed a dynamo which marked a distinct advance upon anything previously known, characterized by an enormous improvement in efficiency; complete apparatus for regulating and controlling the current; the design of a complete multiple arc system of distribution, making each lamp independent of the other; a complete system of underground conductors, with tube feeders, mains, junction boxes and service boxes, with switches and fuses; a complete interior wiring system with switches, sockets, cutouts, safety plugs and other devices, and that most essential device for the successful business exploitation of the system, the electric meter for measuring the current delivered to the consumer.

Let us now consider in some detail this Pioneer of Central Stations. The building occupied by the station itself covered an area 25 x 100 feet and was an ordinary 4-story and basement brick structure, in which the first and second floors had been removed and stiff steel girders substituted, designed like an elevated railroad structure with foundations in the basement. Four Babcock & Wilcox boilers, with a rating of 240 horsepower each were installed in the basement, with coal and ash handling equipment. Six jumbo dynamos, each of a capacity of 1,200 lamps, directly connected to a Porter-Allen (later Armington & Sims) engine, each of 125 (rated) horsepower were installed in the steel structure, thus making the total capacity of the plant 7,200 lamps, or, roughly, 750 (rated) horse-power.



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The upper floors were occupied by the feeder regulators and indicating apparatus and a test lamp bank of 1,000 lamps.

When this pioneer station was started, and in fact for some time afterward, there was not a single electrical station instrument in the whole station—not a single voltmeter or ammeter! The station was, however, in every respect a perfect prototype of the most modern type of central power plant, with provision for every emergency, coal bunkers, reserve water tanks, forced draught blowers, etc., etc.

As previously stated, the station was started September 4, 1882. On October 1, 1882, there were connected to the station 59 customers in whose premises were installed 1,284 lamps; on January 1, 1883, the connected load had been increased to 231 customers, with 3,477 lamps installed.

It is important to note that from the first inception of the system Mr. Edison had provided that motors should be capable of being supplied from the very same wires as the lamps and, in fact, the first motor was connected to the system in 1884 and the first multiple arc lamp in 1889.

Such was the pioneer electric light and power plant in New York City, out of which has grown one of the greatest of the world's great industries.

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MR. EDISON is accredited by many with the invention of the incandescent lamp. If I were speaking to my associates and among those exactly informed I might use the same expression for the sake of brevity because to Mr. Edison we assign the credit for having given to the world the first practical incandescent lamp as a crown and climax to a system for making available the subdivision of the electric light of which I shall have more to say later.

The facts are, however, that there were many so-called incandescent electric lamps before Mr. Edison made his. The earliest ones were made before he was born.

Very few of them would operate for more than a few minutes before burning out and their light-giving qualities were highly variable throughout their evanescent lives.

They were all of low voltage and could only have been used in series on distributing circuits for general illumination because of this low voltage. So serious was this voltage limitation that all proposals for such use was for series burning, although there was nothing novel in operating electrical apparatus in parallel.

Into this chaos came Mr. Edison's complete operating system crowned with a practical lamp.

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FIFTY years ago the wonderful, scientific age in which we are now living was just beginning to take form. For the purpose of this story which I am attempting to depict, let us divide into two periods this age of metals which began before our time and in which we are living. The first period will never end, but it began when metals were used for replacement of other materials where the metals performed a better or cheaper function than the materials they displaced but where their use did not bring to the world any thing with which it was not already somewhat experienced. In this class I would place the use of steel and iron, for railroads, for the framework of buildings, for the construction of ships, etc.

All of these uses were replacement uses and were of vast service to mankind. The use of iron and other metals for other purposes, such as their use in steam engines and boilers to furnish power, has not introduced to the world anything for which the world was not fully prepared. We properly hear much credit given to the wonderful steam engine and while its invention did permit power to be more generally used, power had been made by wooden water wheels for generations and was not a novelty in the academic sense.

The second period, to which I have referred, was that period which began when people began to understand that the scientific discoveries which had found their principal expression in giving to the world certain metals contained potentialities beyond replacement values, unknown and undreamed of by the older generations. In this second class will fall all electrical development. The inventors of the electric telegraph had already given people a hint of the wonders to come. Mr. Edison was one of several pioneers in this electrical field, though probably the greatest of them all.

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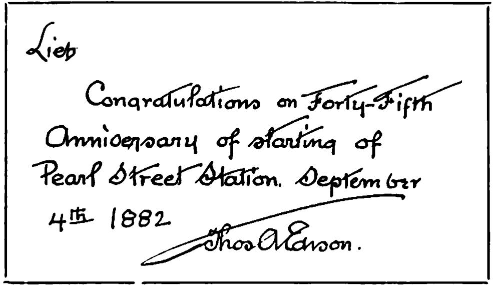

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When Mr. Edison began his work the dynamo had been invented and was well known to the scientific world. It was used for electro-plating, electrolizing, etc. It was principally used, however, for arc lighting. Primary batteries and storage batteries were also known. It was clearly understood that dynamos and storage batteries might be used for telegraphy, etc., but the chief use of scientific knowledge in this new field of the second period which I have mentioned was for the production of electric light by means of the open carbon arc.

PEOPLE had welcomed this wonderful, new illuminant for street lighting. The news was flashed around the world that here was something which had tremendous possibilities but which also had one great deterrent for domestic use, which was that this wonderful new light was much too big and too brilliant for use in interiors. It was true that many stores, big buildings, auditoriums, etc., had adopted it, but everywhere people appreciated a need for which there had been coined a phrase. People soon came to know very well what was meant when it was said that we needed to find a way "to subdivide the electric light."

In every age there are certain well defined problems. Mr. Edison tackled one of the outstanding ones. He had already done notable things in telegraphy, etc., and because of his remarkable work had won money and backing with which to go ahead. It was this with which he embarked on a great big glorious adventure, as truly a pioneer in a real new world as if he had blazed a trail into an uncharted wilderness in a geographical sense.

For the sake of the younger men I will attempt to further clarify the picture by drawing an illustration from modern conditions.

We all know that there are fascinating possibilities in air travel, but that there are two tremendous liabilities which are still associated with it.

One is, that because our present planes must maintain a high speed, they cannot settle down on a small lot, as does a bird. When the power fails, they must maintain a considerable speed to the point of landing, or crash.

We also know that there are times in fog or storm that they cannot land as up to the moment no one has known how to give them the necessary information as to the landing field which is necessary for their sucessfully so doing. These two needs are so well known that they are common property.

In a parallel sense it was just as well known and understood that the "subdivision of the electric light" was an outstanding need for the successful development of electric lighting in Edison's time. Men comprehended that distributing systems would probably be developed to fit around the proper solution which might or might not require new knowledge but no one knew whether or not we would require new knowledge until they knew the requirements for this sought "subdivision of electric light."

IF I have succeeded in giving you a picture of the conditions preceding Mr. Edison's great contribution, you will understand how the older men all appreciated that it is no deterrent to Edison's fame that he was able to use a dynamo not much different from a common type, that he used insulated wires which were known or that when he made his underground system, he used existing knowledge. It is rather to his credit that his solution permitted him to use many things which did not require much modification to make them fit into the new system. The small modifications which were required, however, were often essential to make some of the older development meet the new needs.

I hope that I have made it clear that when we say that Edison invented the incandescent lamp that what we really mean is that Mr. Edison saw with crystal clearness that it would be posssible "to subdivide the electric light," if he could make a very thin filament which would therefore have small area, if he could make it sufficiently long so that it should have high resistance, and if he could guard it so that it would not change for many hours. He knew that he would be able to feed this thin conductor thus produced with electricity through wires which would not be prohibitively large and expensive. He saw that it would be desirable to run these lamps in multiple to facilitate turning them on and off.

While this conception gave us an incandescent lamp, I trust that I have made it clear that Mr. Edison was not primarily inventing an incandescent lamp. It is true that his type of incandescent lamp was the key-stone to his arch, and that it was the definitely novel and different thing which permitted him to put before the world an invention and achievement which formed the foundation for the tremendous development of the second epoch of scientific fulfillment then just beginning to take form.

Incandescent lamps were known before Mr. Edison was born, just as oil lamps were known before kerosene was discovered; just as savages used torches of resinous wood, long before we have any record that they knew how to surround something which answered as a wick with resin or grease to make a candle. The whole story of human development has been one of gradual evolution and so it was that there were many early forms of incandescent lamps made by people whose names it is not necessary to list here.

Mr. Edison was able to make a mental picture of a system from fuel to lamps, all of which depended upon his being able to make a certain kind and type of lamp. So true was his vision, and so thoroughly did he comb the field of existing knowledge that the lamp of October 21, 1879, proved to be a true prototype.

I have read over many hundreds of patents referring to incandescent lamps and lighting systems. Mr. Edison's contributions were enormous but by no means were they the only contributions. The indefatigable workers of those days, just as now, produced invention after invention until the number aggregated hundreds. No search for gold, nor any stampede for land allotments in our West was more strenuous than the efforts of these pioneers.

HOOVER EXPECTED AT DEARBORN, OCT. 21

TENTATIVE travel plans made by President Hoover will, press dispatches say, bring him to Detroit on October 21 in time to address the culminating celebration of "Lights Golden Jubilee" to be held at Dearborn under the auspices of Henry Ford and at which Mr. Edison, reported to be rapidly recovering from his recent serious illness, is expected to be present.

Announcement comes from 27 states, so far, that an official character will be given to the celebration by Governor's proclamation or message. These states are Arizona, Arkansas, California, Florida, Idaho, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Wisconsin and Wyoming. Ohio, where Edison was born; Michigan, where his youth was passed, and New Jersey, where his chief inventions were made, are naturally especially eager to participate in the jubilee, and their respective governors—Myers Y. Cooper, Fred W. Green and Morgan F. Larson—in their official utterances are emphasizing the connection of Edison with their commonwealth.

When I speak tersely and say that the solution was reached in a filament of high resistance surrounded by a high vacuum, it gives but a faint picture of the many, many experiments by which these two things were obtained. Mr. Edison found, for illustration, on many occasions that although he had obtained a vacuum which was sufficient by any of the laboratory standards of the day, that the filaments he had made and which he believed to be alike performed differently, one from another, when made into lamps in the days following the famous day of October 21, 1879, when he first saw success in sight. This was regardless of the fact that the vacuum surrounding these filaments was quite acceptable according to the standards of the day. His patents show that he searched indefatigably for the causes of the slow deterioration of his filaments. In this process he discovered the electonic discharge which was then called the "Edison effect" and which since has been utilized to give us the radiotron.

IF anyone thinks that we are overemphasizing the credit due the master mind which gave us our solution, let him invent a heliocopter or some other solution to give us our airship with the negligible landing velocity, or better yet, let him devise a scheme by which even the modern plane can safely land though the aviator be blinded by storm or fog.

These solutions all are easy after they are made. You gentlemen, who have pioneered here in the Rockies, with the pioneer transmission problems in this territory know that it is simpler now to carry a hundred thousand volts across the Divide than it was to similarly provide for ten thousand volts in the old days.

I have welcomed this opportunity to say to you what I have said. My disposition is to say much more but I have lively recollections of the reminiscences of the older men when I was a youth, and how difficult it was for me to understand and share the enthusiasms of my elders.

Light's Golden Jubilee has been universally accepted as an opportunity to give credit to one of the great victories of Peace.

There are many monuments to the achievements of passion—to war madness and the like—there are voluminous records and artistic delineations of deathless jealousies, intrigues and double dealings. We celebrate in Light's Golden Jubilee the achievement of reason and hard work and the name of a popular hero of both. Quite the opposite to passion and intrigue.

Depreciation Accounting Methods for Public Utilities

By L. R. Nash

THIS paper deals with only that part of the broad subject of depreciation which relates to the method of accumulating adequate reserves through which to retire property that ceases to be useful. Only incidental reference will be made to the valuation phases of the subject. The discussion is further restricted to the field of public utilities as they exist in the United States because of the special conditions under which their operations are conducted.

Nearly all public utilities are subject to regulation by governmental bodies, usually state commissions. Theoretically, their operations are monopolistic, and one of the primary functions of regulation is to fix rates which will yield a return to investors consistent with that which they could obtain from investments in other industries with similar risks. Such regulation implies that the cost of service, including operating expenses and taxes, depreciation requirements, and a fair return upon the value of the property, shall be readily determinable. Obviously, this requires a system of accounts which consistently reflects the financial showing and operations of the properties.

Refinement in such accounting is in many respects more important than in other industries operating on a competitive basis with prices determined by the law of supply and demand. Even in these industries more careful attention is now given to depreciation accounting because of its bearing on federal income taxes. The word "depreciation" has acquired so many meanings that, to avoid confusion, the more definite term "retirements" will be used herein for some of the matters under discussion.

Depreciation Accounting History

Although the major developments in the public utility field have occurred within the past forty years, the investment in electric power, gas, local transportation, water, and communication utilities in the United States is already approximately equal to the total investment in steam railroads, and the combination of utility and railroad investments is, in turn, approximately equal to the total investment in all manufacturing enterprises.

The early years of public utility history were devoted to pioneering and development work, with comparatively little attention to accounting. Depreciation was given scant, if any attention. In fact, prior to the Knoxville decision of the Supreme Court in 1909, there were several court decisions denying the right to allowances in excess of current repairs. Other than for isolated instances, no attempt at broad standardization of utility accounting was undertaken until about twenty years ago. In 1909 the Interstate Commerce Commission made effective a system of expense accounts for interstate electric carriers. In 1914 the Commission revised and enlarged this system to cover all classes of accounts, including definite provisions for depreciation charges and reserves. These provisions applied to all classes of railway property, but were made compulsory only for rolling stock. The State regulatory commissions have found this system generally suitable for the intrastate electric railways under their jurisdiction, and no other system of railway accounting has been extensively used.

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In the meantime various State commissions had developed their own systems of accounting for other classes of utilities under their jurisdiction, there being no corresponding federal agencies. While these systems were basically similar, they differed in many details and occasioned much confusion and annoyance to utilities operating in more than one State or to groups of widely distributed affiliated utilities. This difficulty was duly recognized by the various regulatory bodies, and in 1919 the National Association of Railroad and Utilities Commissioners appointed a special committee to draft a uniform system of accounts in collaboration with accounting representatives of the national utility associations. Such a uniform system, with appropriate subsidiary details for electric, gas, and water utilities, was completed and formally approved by the Association in 1922. This approval was not binding upon the members of this Association in their official capacity as commissioners of the several States, but the uniform system has gradually been prescribed by the State regulatory bodies until at present three-fourths of the States authorized to prescribe accounting methods have adopted this system. Since the development of this standardization, only one State for special reasons have adopted any other system. Other States are contemplating the adoption of this system, and still others would have done so but for the fact that their own previously prescribed systems agreed so closely therewith as to make a prompt change unnecessary.

In 1927 the Interstate Commerce Commission, after further consideration of the subject of depreciation, proposed a more complete and detailed system of depreciation accounting for interstate electric carriers, corresponding to a similar system proposed in the preceding year for railroads. This procedure was in conformity with the provsions of Section 20 of the Transportation Act of 1920, requiring the Commission to determine the classes of property for which depreciation charges may properly be included in operating expenses, together with the extent of such charges. It is to be noted that the Act in question contains no direct mandate that any such property shall be so classified. The order of the Commission making the new system effective in 1928 was first suspended and then withdrawn for further consideration because of widespread criticism.

Two Present Standard Systems

The utilities in the United States, therefore, have two major systems of accounting: (1) the system developed by the Interstate Commerce Commission for interstate carriers and a similar system for communication companies under its jurisdiction; and (2) the uniform system developed by the State commissions for local utilities under their jurisdiction. These are herein referred to as Interstate and State systems respectively. In general, there are few fundamental differences between the two systems, both embodying recognized and established accounting principles. There is, however, a striking difference between the Interstate and the State systems with respect to depreciation accounting.

The Interstate System used by carriers and communication companies, and similar systems adopted by the Federal Power Commission and to some extent by federal income tax authorities, are based on the general theory that utility property is gradually consumed in service, that the useful life and salvage value of the various property elements are known with reasonable accuracy, and that uniform charges should be made in operating expenses for currently accruing depreciation. This is not done for the property as a whole, but major units or groups of similar units must under existing practice have separate subsidiary reserve accounts provided for their retirement, and deficiencies in one of these accounts may not be made up from excess in another. In other words, the charge against any subsidary reserve in connection with a particular retirement is limited to the amount previously accrued therein with respect to the units of property involved. This so-called straight-line system of depreciation charges is intended to create and maintain a reserve consistently equal to the accrued depreciation of the property, and under Interstate regulatory practice it is considered appropriate to deduct such reserves in determining the fair value of the property. However, this latter practice is not approved by the Federal courts.

Pending the contemplated revision of Interstate depreciation accounting methods, the following quotation from the 1914 classification for electric carriers, relating to depreciation charges on equipment, will indicate the character of methods now in effect:

> This account shall include uniform monthly charges representing the depreciation of equipment. These charges shall be based upon the percentage of the original cost (estimated if not known), record value, or purchase price of such equipment determined to be equitable from the carrier's experience and best sources of information as to the average current loss from depreciation.
>
> A statement of the basis used by the accounting carrier for computing the charges hereto shall be included in its annual report to the Interstate Commerce Commission.
>
> Depreciation charges with respect to any unit of equipment shall cease when the difference between the ledger value and the estimated scrap value shall have been credited to the accrued depreciation account.
>
> Note A. All charges to this account shall be concurrently credited to balance-sheet account No. 443, "Accrued depreciation—Road and equipment."
>
> Note B. When any unit of equipment is retired the difference between its ledger value (less salvage) and the amount previously taken up in the accrued depreciation account for such unit shall be adjusted in the month in which the retirement occurs as follows: The proportion of the actual loss from depreciation assignable to the period prior to July 1, 1914, shall be charged to Profit and Loss and the remainder shall be charged to Account No. 41, "Equipment retired."

The State system of accounting involves a quite different theory and provides a reserve for retirements rather than depreciation. In fact, the word "depreciation" does not anywhere appear in the State system of accounting. This system proceeds upon the assumption that it is not practicable, or at least not necessary, to determine the useful life of property elements. It provides for a reserve, not to offset loss in usefulness or value but, rather, for the purpose of equalizing retirement costs. Even if equality existed in the amount of the reserves created under the two systems, a fundamental difference still exists, in that it is not required that the reserve be accumulated uniformly or through charges included wholly in operating expenses. The method of accumulation of the retirement reserve may best be described in the language of the uniform system with reference to the single retirement reserve account from which the following is quoted:

> To this account shall be credited such amounts as are charged to Operating Expense Account "Retirement Expense," appropriated from surplus, or both, to cover the retirement loss represented by the excess of the original cost, plus cost of dismantling, over the salvage value of fixed capital retired from service. When any fixed capital is retired from service, the original cost thereof (estimated if not known, and where estimated, the facts on which the estimate is based should be stated in the entry) should be credited to the proper fixed capital account and charged, plus the cost of retirement, less salvage, to this account. If the credit balance in this account is insufficient to cover the retirement loss, the excess over the balance contained in the reserve should be charged to account No. 132, "Property Abandoned," which see, or other appropriate account.
>
> The losses which this account is intended to cover are those incident to important retirements of buildings, of large sections of continuous structures, like electric line, or of definitely indentifiable units of plant or equipment, and the purpose of the account is that the burden of such losses may be as nearly as is practicable equalized from year to year, *but with due regard for amount of earnings available for this purpose in each year.*
>
> (Italics supplied.)

It will be seen that the basic difference between Interstate and State systems relates to useful life, the first assuming that this can be determined with reasonable accuracy and that appropriations should be uniform, the second assuming that useful life is uncertain and that flexibility in appropriations is not only reasonable and proper for that reason, but also for stability of income and maintenance of credit. In the light of this difference it is pertinent to inquire into the facts as to the certainties or uncertainties of useful life of utility property.

Facts Regarding Useful Life

The author has made careful studies of this subject based on a practical experience and contact with local public utilities for a period of more than thirty years. This experience does not include communication companies, which have materially different characteristics from other utilities and may justify different treatment. Based upon this experience, the author cannot subscribe to any theory implying a definite or even approximate knowledge of future usefulness of existing utility property. Changes and developments so far in the major groups of utilities have been both rapid and radical. Many substantial units thoroughly modern when installed have ceased to be useful when not more than one-third or even one-fourth of their expected useful life had expired. Other such units have survived far beyond the expected period of life although their actual usefulness has usually been curtailed. Many conscientious efforts have been made by groups of utility accountants or engineers representing national organizations to standardize useful life data. These efforts have uniformly failed because experienced participants have insisted that such efforts would be not only futile but misleading.

The Wisconsin Railroad Commission is among the oldest of our regulatory bodies having jurisdiction over all classes of utilities. Its decisions and practices have commanded wide attention and high regard. A few years ago it caused its staff to make an exhaustive study of useful life data, including all available published information. Tentative life tables applicable to Wisconsin conditions and covering all classes of property were compiled. They showed maximum and minimum normal expectations and, in general, the former were at least 50 per cent, and more commonly nearer 100 per cent, larger than the latter. Furthermore, accompanying explanatory notes stated that many units would fall far outside these limits, indicating extreme difficulty in determining any definite useful life data. The Commission has, accordingly, refrained from any such procedure, as have other similar regulatory bodies. In the light of such action with respect to localized property, subject to known routine climatic and other conditions, the greater difficulty in forecasting useful life of property not so localized, subject to widely varying conditions and influences, is obvious.

It is sometimes contended that the utility industry has emerged from its period of rapid evolution and may expect greater stability in its future technical development. Such contention cannot be logically accepted in the light of the present transition in methods of local transportation, long-distance transmission and interconnections in the electric power industry, superpressure steam generation, mercury boilers and turbines, high-pressure transmission of natural and manufactured gas, and the possibilities of a non-toxic complete gas—all suggesting further significant and perhaps radical changes in facilities.

Causes of Retirements

The problem of useful life may be clarified by an analysis of the causes of retirements. These causes may be broadly divided into two groups, physical and functional. The former includes wear, decay, corrosion, and other similar causes related to actual service or exposure to the elements. The effect of the factors in this group may in a given locality be predetermined with reasonable accuracy, but in different localities and under different service conditions there may be wide variations.

Functional causes may, in turn, be divided into groups which have sometimes been designated as obsolescence, inadequacy, and supersession. The first named factor in this group, obsolescence, involves the results of scientific research, engineering developments, changes in the art, and economic progress, all of which, as already indicated, have a very important influence on utility property. The term "inadequacy" includes those causes of retirement due to growth and physical development of the business. In the electric power industry this has been particularly effective, and many important units of equipment, especially in power stations, have ceased to be useful after only a few years of service because they were no longer large enough to play an important part in dependable service. These influences are and will continue to be effective without substantial abatement, at least for a considerable period of years.

The third group of functional causes, supersession, includes those originating in governmental requirements or public demands covering changes in character of service or facilities incident to community growth, civic pride, or other factors not properly included in the two previous groups. Specifically, this group includes street paving and re-paving, changes in type of rolling stock, substitution of underground distribution systems for previously existing pole lines, or metal or other ornamental poles in place of ordinary ones, changes in character of lighting equipment, and other similar factors.

It has been the writer's uniform experience and observation that comparatively few important elements in public utility property are retired because they are worn out or have decayed, or for other physical reasons. The preponderance of retirements is due to the functional or non-physical causes just described. While specific data substantiating these statements are not commonly available, one particular study, believed to be typical and covering a long period of years, will serve as an illustration.

A railway property in a western city analyzed retirements during a period of approximately twenty years, involving about $1,000,000 of investment. It was found that only 14 per cent of this total amount covered retirements because of wear and tear, corrosion, and other physical causes, including accidents. The remaining 86 per cent was due to obsolescence, inadequacy, and municipal or other public requirements in which, of course, paving played a substantial part. Nearly one-half of the trackage of this property is located on private interurban right of way, but, in spite of this, it may be that railway property located in other cities of slower growth and less prosperity would show a lower percentage than that stated.

It is of interest to note that if this property throughout the period studied had made straight-line appropriations for depreciation for all its property, based on conventional estimates of useful life, it would have accumulated a net reserve amounting to one-third the total investment in the property, which reserve would be three times the reserve actually created under the more flexible system of appropriations in effect.

Corresponding figures are not available for other classes of local utilities, but it is to be expected that they would show a somewhat smaller proportion of retirements for non-physical causes. Changes corresponding to those in railway track and paving requirements are not involved, but the more rapid growth of other utilities, particularly electric power, makes the obsolescence and inadequacy factors of great importance. It is estimated that not far from 75 per cent of the normal retirements of important units of these other classes of utilities are due to non-physical causes, and only 25 per cent to physical causes. Passage of time is a direct factor in the latter group, but has little if any direct influence upon the former. It may be that more definite, specific data, when obtainable, will show that the non-physical percentage here estimated is high, but it must be noted that replacement of small units through maintence charges is not under consideration.

The conclusion to be drawn from the foregoing analysis of useful life data is that time is only a minor factor among the causes of retirements, and that it should not be the sole or even a major basis of retirement appropriations. This being true, the straight-line depreciation accounting system lacks a logical basis for its support unless by some means the necessary errors in estimating the lives of various property elements may be used to counteract each other. It is generally true that the sum of a group of estimates is more accurate than the various components, and this is undoubtedly the case with utility useful lives. Such averaging is, however, permitted to only a limited extent in the Interstate system. Major items or groups of similar items have restricted reserves which may not borrow from or lend to each other, thereby nullifying a possible gain in accuracy.

This disadvantage would be partially reduced by suggested revisions in the proposed Interstate system, which provides separate reserves only for each main group of fixed capital accounts, but the obstacle to real accuracy would still remain. It would still exist if a single composite reserve were permitted so long as it was based on a fixed percentage derived from weighted average life. The State system, as already mentioned, has one expense account or the alternative surplus as the source of the single reserve which makes for maximum accuracy regardless of the basis of charges.

Other Interstate Accounting Characteristics

Turning now from useful life uncertainties, it is in order to consider other phases of the Interstate system. It is, of course, true that errors in estimates, when detected with the passage of time, can be corrected, but such corrections may seriously distort operating expenses, in which depreciation charges are included, and require explanations and analyses for the satisfaction of executives and investors. The accounting work required by such changes and by the system as a whole is voluminous and expensive, and not warranted by the results secured. The Commission proposes to increase still further these accounting complications by including within the scope of the reserve accounting many small items heretofore handled through maintenance accounts. These include such items as ties and poles, which are replaced with approximate uniformity on all large properties, with a minimum of accounting cost.

The extent to which maintenance accounts are now used to record replacements varies through wide limits. Large properties, to a greater extent than small ones, can replace important units in this way without disturbance of income statements. The large railroad systems have often stated that they need no reserve for equalization purposes, except possibly for large terminal developments. Some of the largest electric power and gas systems are similarly situated, and it is common practice to restrict the use of their reserves to retirements of costly units of property. The State system of accounts does not clearly define the size or cost of units which may be replaced through maintenance accounts. Further definition is under consideration, but, for consistency with existing provisions for flexibility, it may well be avoided unless expressed in relation to total investment in all classes of property. Many utilities have found that a combination of maintenance and retirement charges affords a better guide to full property upkeep than separate consideration of retirements.

Incidentally, it may be noted that the estimating of salvage value, to be recovered many years hence when units of property are retired—this being a necessary step in the determination of "wearing value" which must be accounted for—involves many uncertainties, the controlling factor usually being the ratio of demand to supply of certain basic raw materials at the particular time of retirement.

As will be shown more fully in subsequent discussion, straight-line depreciation charges are larger than corresponding retirement charges, and, in the absence of offsetting factors, require more revenue and higher rates for service. Customers are, therefore, directly interested in the matter and may protest against a system which causes them to contribute toward utility financing and further protection to invested capital, without adding to the safety or reliability of the service they receive. Such protests have been made in numerous rate cases.

It may also happen that large, uniform charges for depreciation in years of underdevelopment or business depression may so disturb utility credit as to make financing of extensions and improvements impossible, to the detriment of both customers and community. There have been cases in the traction field where a strict application of Interstate accounting methods to all classes of property has resulted in a failure to show gross income sufficient to meet interest obligations. Receivership has not necessarily resulted because a large part of the cash involved in unnecessary depreciation charges, included in operating expenses, is commonly available for other immediate necessities.

Further references to weaknesses in the straight-line system are here unnecessary and would unduly extend the discussion. In justice it should be stated that it has real advantages where business stability permits, where revenues are derived from rates which are well within the value of service, and where adequate and conscientious executive supervision is not assured.

Sinking-Fund Method

Before passing to consideration of details of the retirement system, a word may be in order regarding the sinking-fund method of accruals. It is the only other method than those herein discussed which has been given noticeable attention in this country, and its actual use in utility accounting has been very limited. It is clearly the proper method to use in many economic studies, but its complications for routine accounting are objectionable. It is particularly difficult to apply it equitably to a mature property which has previously used some other system and presumably has an accumulated reserve quite different for that which a sinking fund would have developed in a similar period.

The sinking-fund method is a modification of the straight-line method under which interest accumulations are added to a reduced annuity to yield the same total at the end of the estimated useful life. It is a dangerous modification, particularly for property of long life expectancy, because the annuities are then radically reduced and depend largely on interest accumulations in the later years for creating the required reserve. If, under the uncertainties of useful life, an important property element ceases to be useful long before its estimated life has elapsed, the sinking-fund reserve for its retirement will be wholly inadequate. Statistical demonstration of this fact can readily be drawn from standard tables of sinking fund accumulations.

It may, however, be pointed out that the sinking-fund method has one advantage in rate cases. It avoids an estimate of accrued depreciation as a factor in fair value based on actual or theoretical accumulated reserves, because such reserves, invested in the property, as they usually are, must earn a return for their own accretion and cannot be excluded from the rate base. An interesting and simple modification of this method has had regulatory approval. Under it accumulated reserves, by whatever method created, are allowed to earn a fair return which is deducted from the annual appropriations otherwise suitable to determine the current depreciation factor in the cost of service.

This method, in effect, has been widely used. Under flexible systems of retirement accounting the earnings of all property, including that in which the reserve is invested, automatically go into profit and loss account. The annual appropriation from this account to the retirement reserve is made up of two factors: (1) contributions of customers toward retirement needs; and (2) earnings of the invested reserve. The former item only need be included in statements of the current cost of service to be collected through rates, provided that an undepreciated rate base is used. The propriety of using an undepreciated value is one of the distinct advantages of this method which is not widely followed in rate cases but is, nevertheless, consistent with common, although perhaps not standardized, procedure. This plan, in fact, is equally appropriate whether reserves are created under the straight-line, sinking fund, or flexible methods. It requires that the depreciation reserves shall be definitely and equitably separated from surplus, a matter which should have careful attention under any procedure.

State System Characteristics

Turning now to the State system of retirement accounting, the central feature calling for attention is its flexibility. This may be permissible to a greater extent for public utility property than for other classes because of the unlimited life of the public utility business. It is not conceivable that public utility service as now existing can be abandoned. On the contrary, most branches will continue to expand and become more and more necessary to community life and prosperity. Industrial units of other kinds may come and go, their existence depending in part upon life of patents, competition, fashions, individual prosperity, and many other factors. It is reasonable that such an industry should include in the cost of its product the amortization of a substantial part, if not all, of its investment within a reasonable period of years. If, on the other hand, public utilities are to go on without limit, similar amortization is less necessary.

Public utility industries have in recent years shown a notable stability in their revenues and income. The successive phases of the conventional business cycle have less effect on public utilities than on other industries. Fluctuations in income of substantial proportions, nevertheless, occur, particularly in those units of the industry which operate in industrial districts. It is this relative stability of public utility income which has made investments in public utility securities increasingly attractive in recent years. Coincidentally, there has been a decrease in yield from public utility securities, to which this increase in stability has contributed. Stable employment or compensation permits lower unit wages for capital as well as labor.

Lower cost of money means correspondingly lower cost of service. If stability of income and a corresponding improvement in credit are significant factors in the cost of service and in the corresponding rate structures, it is logical that credit should be protected and stimulated in all reasonable ways. The exceptionally high investment in public utility facilities in relation to annual revenues is a well-recognized characteristic. With an investment of about five dollars per dollar of revenue, the capital "turnover" period is about five years as compared with less than nine months in the average industrial establishment. This high utility investment is largely due to the greater proportion of the value of product or service created within the industry itself, averaging about 80 per cent as compared with half that amount in other typical productive enterprises. From 30 to 40 per cent of the revenues from public utility service is normally required for interest, dividends, and surplus. Even a small saving in these requirements is a much larger proportion of the total revenues than is found in any other industries, and such saving is correspondingly more important.

The State system of retirement accounting under which reserves are created through charges to operating expense or appropriations from surplus, or a combination of the two, does not undertake to define the relative proportions of the two contributing factors to the reserves, nor the extent to which flexibility in charges is permissible. It is sometimes urged that this is a serious and perhaps vital weakness in this system in that necessary provision for impending retirements may be omitted or unduly postponed, or, under other conditions, excessive appropriations made leading to the accumulation of excessive reserves and treated as a part of the current cost of service.

There is undoubtedly merit in this criticism, and in the absence of close regulatory supervision, a distorted showing of prosperity, or lack of it, may result either intentionally or through negligence. Such possibilities, however, should not lead to condemnation of a system otherwise meritorious but should indicate the need of a systematic as well as flexible system of charges. In the opinion of the author, constructive steps in this direction are needed to remove from this system of retirement provisions any just charge that it may be erratic and misleading.

Methods of Securing Flexibility

There are various ways in which this result can be measurably accomplished. If an estimate of useful life, even if adjustable from time to time, and percentages derived therefrom, do not recognize controlling factors in the determination of retirements, there may be other bases of retirement appropriations which tend automatically to adjust themselves to changing requirements.

Among other methods which have been widely used as the normal basis of retirement appropriations are gross earnings and units of output or service. Such methods have repeatedly been criticized as illogical if not misleading. Careful consideration will show that such criticism lacks sound foundation. Assuming that retirements are largely occasioned by the non-physical causes already enumerated, let us analyze these causes to see what, if any, relation they have to utility revenues.

Taking them in their order, obsolescence leads to the abandonment of facilities which are relatively inefficient and not in keeping with modern scientific standards of service. The extent to which property will be retired for such causes depends in a substantial part upon the prosperity of the business measured roughly by its revenues.

Inadequacy, which is probably the most important cause of retirements, arises directly from growth in business. The more rapid the growth the sooner generators, gas holders, services, transformers, rolling stock, and other facilities become inadequate and are replaced by larger units. Revenues are a direct and automatic measure of inadequacy and, therefore, of necessary provisions for retirements due to these causes. A uniform percentage of revenues or a corresponding charge per kilowatt-hour, per thousand feet of gas, or per car mile will tend to maintain retirement reserves proportional to needs.

Supersession is of a similar character. As cities grow underground systems are required or extended, new street lighting installations are demanded, new types of transportation become better adapted to community needs, and paving requirements increase. As the community grows more or less rapidly, so do utility revenues, and again a percentage based on revenues or service units tends automatically to maintain adequate reserves.

It is not contended that such a system of charges will be wholly successful in continuously maintaining an adequate reserve, but it is the author's opinion, based upon personal experience with retirement provisions made or checked by such methods, applied to many widely distributed properties and covering a period within which more than 90 per cent of public utility development has occurred, that this system yields more satisfactory results as to adequacy and timeliness of appropriation, together with stability of credit, than any other known system.

If one seeks for greater refinement and wishes to include a stable portion of retirement provisions in operating expense, the total appropriations might be divided into two parts: (1) a charge, to be included monthly in operating expenses, covering physical deterioration, depending on lapse of time and involving substantial uniformity; and (2) an allowance based on non-physical causes in which flexibility may be permitted, and for this reason best provided for by annual appropriations from surplus.

If fluctuations in volume of business give the necessary flexibility, the total retirement provisions might be expressed in the form of the following formula:

$$A = \frac{V}{n} + Rp$$

In this formula A represents the required total annual provisions for retirements; V is the investment in useful property or, if preferred, those portions of it subject to retirement for physical causes; n is the number of years of weighted average useful life; R represents annual revenues; and p is a suitable percentage applied thereto to provide for the non-physical factor in the appropriations. The first factor may readily be converted into uniform monthly charges.

If, as will probably be the case, such a formula does not give sufficient flexibility, it may be modified into the following form:

$$A = \frac{V}{n} + R(p \pm t)$$

The new factor t in this formula is a so-called tolerance factor by which the normal percentage may be increased or decreased as occasion requires. The first factor remains unchanged because deterioration is assumed to be constant. Such a formula furnishes a rule which may be applied by accounting staffs under executive supervision.

It is interesting to note that various efforts have been made by the federal income tax authorities to standardize useful life of property to facilitate their checking of income tax returns. Some time ago they requested contractors engaged in construction operations to make estimates of this character based on their experience. After careful consideration the contractors reached the conclusion, and so reported, that no fixed estimates can be made of useful life of construction equipment because of varying conditions of operation and extent of use, but that with a suitably broad tolerance factor, a general formula for exhaustion, wear, and tear might be adopted as a basis of depreciation claims in income tax returns. After due consideration the income tax authorities recently decided to abandon, for the present at least, any such program.

Executive Responsibility

It is not wholly clear that even the final formula stated above, embodying double possibilities of flexibility, is wholly satisfactory for practical use in that it puts into the hands of accountants with only intermittent executive supervision the problem of fixing retirement provisions. The necessary supervision is not consistently available in many cases. It is believed that this matter is one for real executive responsibility rather than merely supervision. Accountants cannot know in detail the physical condition of existing property, the need of impending or remote retirements, prospective technical developments, political influences, and adequacy of existing reserves, for which matters executives should be responsible. It is quite as logical that boards of directors, assisted and advised by operating executives, should pass upon retirement appropriations as that they should be responsible for declaring dividends and making other appropriations from surplus. Accountants should not question this procedure as it relieves them of the necessity of including in the operating expenses figures that they know cannot have the accuracy embodied in all the remaining compilations and that cannot be cleared or reconciled at annual intervals as are certain other necessary suspense accounts.

Such executive action may have a formula as its basis or as a check, although it is the author's view that an informed judgment exercised at least annually and expressed in a round sum of money, in the light of the various significant factors just mentioned, may be more in the interests of the utilities and their customers than a more automatic and less flexible procedure. It is obvious that such action, or even the fixing of tolerance percentages in such a formula as is suggested herein, requires not only judgment and experience but, perhaps more important, a consciousness of a definite purpose and a recognition of a public trust.

To this end every utility should have a definitely determined goal which it should consistently aim to approach. This goal may be a reserve of a certain magnitude determined by the character of the property. In years of depression the approach toward this goal may be insignificant, but in years of prosperity prior shortages should be overcome. In other words, during a suitable period of years the average movement toward the goal should be reasonably uniform. Our past experience with business cycles indicates a duration of from three and one-half to ten years. The former period is clearly too short in which to establish a suitable average, and the latter period may not be too long.

It is possible—and perhaps desirable—to recognize flexibility also in the goal in question; in other words, the size of the reserve. During a period of continued prosperity liberal appropriations might build up a reserve of substantial size (15 per cent or more of the investment in the property). On the other hand, a series of unfavorable years or large withdrawals might permit the reduction of the reserve to possibly half its intended maximum amount without endangering the safety of the property or its service. Such a program embodies the possibility of a stable return to investors and the use of the retirement reserve as an indicator of the adequacy of rates similar to the barometer fund found in service-at-cost railway franchises. If the reserve fell below a reasonable minimum, the need of additional revenue and higher rates would be obvious. If, on the other hand, with adequate return to investors, the reserve passed a reasonable maximum point, the utility should voluntarily undertake to reduce rates.

Size of Retirement Reserve

The size of a suitable retirement reserve cannot be arbitrarily fixed within any such limits as above suggested. Under a depreciation reserve policy, with accumulations on a straight-line basis, the accrued depreciation is theoretically equal to the reserve, but this theory has not always been accepted in valuation cases. Our federal courts have repeatedly held that such a reserve, although supported by refined computations made at large expense, was merely an accounting record and not controlling in determining present fair value. Our regulatory commissions, which are concerned with the equities of property rights rather than their confiscation, have given less attention to accrued depreciation in fixing the rate base than have the courts, but for the time being there is always the possibility in rate cases that in final adjudication substantial deductions may be made for accrued depreciation, even when investment is the starting point. Where, in the light of local regulatory history, such possibility exists, the utilities are justified in protecting themselves against it by creating reserves from their revenues sufficient for both retirements and designated accrued depreciation. It is not necessary that the two should be combined in accounting records. In fact, there is much logic in keeping separate retirement records for statistical purposes and analyses of adequacy, leaving the supplementary provision for accrued depreciation in the corporate surplus, which is the customary source of unusual and contingent withdrawals.

Up to the present time it has not been common practice among the regulatory commissions definitely to limit retirement reserve accumulations. There have, however, been a number of cases, particularly in the telephone industry, where reserves have been accumulated on a straight-line basis, of criticism of what was believed to be excessive reserves. The amounts in question have sometimes been 30 per cent or more of the total investment. If such criticism continues and becomes more definite, the futility of refined computations based upon useful life of different elements and corresponding percentages applied to investments therein becomes apparent. At least one commission has indicated that it would authorize the creation of a reserve amounting to 10 per cent of the rate base value of the property and would thereafter approve only sufficient appropriations to maintain such percentage. Such a limitation may provide suitable protection for a large, composite system, but would not be adequate for a property consisting of a few large or specialized units. Nor would it be safe in the absence of assurances that deductions for accrued depreciation would not be made in arriving at fair value.

It has frequently been asserted that under the straight-line method of appropriations a mature, stable property would accumulate an unused reserve amounting to approximately 50 per cent of the total investment. Few utility properties are thus stable, that is without growth, and because of growth, the accumulated reserve will actually be a smaller percentage. A few years ago the author made a mathematical analysis of retirement reserve accumulations under certain assumed conditions of uniformity of growth and characteristics of property elements. ("Public Utility Depreciation Accounting"; *The Journal of Land and Public Utility Economics,* October, 1926.) The results of this analysis showed that the ultimate accumulation indefinitely maintained by such a property would be not far from 40 per cent of the total investment, being somewhat greater for properties of slow growth and less for properties of rapid growth. Departures from such percentages were shown to be not radically different for actual conditions instead of the assumed ideal conditions.

Clearly, such reserves contributed by customers materially curtail the calls on the investing public for additional construction funds. If the major part of such reserves has no other practical use than as investment funds, it may be questioned whether the utilities are justified in forcing such investments from customers who might find investments of their own choosing more satisfactory or profitable.

A word may be said regarding the argument that each customer should pay for the property currently consumed in the rendering of his service regardless of the size of the reserve which may be thereby accumulated. This may conceivably be an ideal situation, but as a practical matter no system of rates so far devised has accomplished this purpose. It is well known that in most classes of utility business a large proportion of the customers fail to pay the full cost of their service, the deficiency being made up by other more profitable customers. The gas industry, as an illustration, has estimated that about one-third of its customers fail to pay their out-of-pocket costs. Another third fail to pay these costs plus full return on investment and retirement charges. The remaining third make up the deficit if the company is actually earning a fair return in addition to all other costs. On electric railways, the short-haul rider pays a part of the cost of the long-haul rider. Busy telephones pay a part of the cost of those infrequently used. Some customers may make up in busy months the costs which they fail to meet in dull months. Many rate schedules are deliberately designed to assess more or less than the full cost of service on certain classes of customers. As a matter of fact, under existing rate practice few, if any, customers pay exactly and regularly the cost of their own service. Furthermore, few customers are concerned as to whether such contributions as they may make for retirements are used toward meeting the full cost of presently retired property which they have used in the past, or as an annuity intended to retire at some future time a minor segment of existing facilities which is assumed to be devoted to their particular service.

If or to the extent that full cost is not currently paid by utility customers, what items are specifically omitted? Obviously not fuel, payroll, taxes, interest, and other payments which must be currently made. The deficiency is either in dividends or retirement appropriations or other factors which are not necessarily uniform. Some approach to regularity is desirable in dividends but is less necessary in the retirement factor, which is a provision for an event that may occur ten or twenty years in the future.

Until the time arrives when utility companies have so radically modified their systems of rates that all classes of customers or even individual customers are charged the approximate cost of their service, including the so-called "property consumed" therein, great refinement in the system of accumulating retirement reserves is illogical. In the long run rate schedules are adjusted up or down to meet varying costs of service. At intervals there are gains above or losses below the cost of service, and some element in that cost is not currently recovered. It is logical that this should be the retirement factor which, as already steated, is least definite, and, therefore, that retirement appropriations within the limits heretofore indicated should be flexible.

Retirement Funds

It has been the practice of some regulatory commissions to require not only the accumulation of adequate reserves through the charges under discussion but also the setting up of corresponding distinct funds among the utility's assets. In a few cases it has been required that such funds be invested in government obligations or other securities having trust characteristics. In most cases the income from such investments has been added to the fund. This segregation is based on the belief that the funds in question should be held in trust to insure the stability of the property and safeguarded as are other trust funds. Furthermore, if the investment is in readily negotiable securities, there would never be any question regarding the obtaining of cash with which to acquire new substitute property.

The objection to this procedure is that the yield from trust funds is low as compared with the return from investment in the utility's own property. The difference between the two yields, which is a definite loss in income, must be made up by correspondingly higher rates. The trust investment theory, therefore, rests on the assumption that investment in the utility itself involves such risks that customers are warranted in paying higher rates in order to safeguard the property devoted to their service. Such an assumption is inconsistent with our established principles of regulation under which the commissions, so far as it is economically possible, are expected to safeguard the revenues and credit of the utilities in the same way that they protect the interests of customers. If under reasonable rates a utility is able continuously to earn 8 per cent on its investment, it would seem an unwarranted sacrifice to accept a return of only half that amount from investment in government bonds merely for added security.

Only a few commissions have prescribed the practice in question. The general practice permits the mingling cash from which retirement reserves are originally created, with other cash assets of the company, and the use of this cash for any corporate purposes. It is possible that, coincident with important retirements, the necessary cash for the purchase of substitute new units may not be available. If, however, retirement funds in substantial amount have been invested in uncapitalized property, securities may be sold against such property and the necessary cash provided. If it should also happen that the company lacks the credit necessary for new financing, the situation would be embarrassing unless the retirements in question could be postponed. Such lack of credit might be due to failure of a commission to recognize its full regulatory obligations which is certainly not a valid reason for restrictive measures relating to retirement assets. Such unfavorable coincidences as are here assumed have not commonly occurred, and, on the whole, the present prevailing practice of not setting aside distinct funds seems to be justified by its results.

Annual Reports

The responsibility already referred to, attaching to the exercise of judgment in fixing equitable standards of flexibility, cannot be over-emphasized. Further action is needed than has commonly been taken by utility executives in formulating a definite retirement policy, the lack of which is criticized by adherents to the uniform straight-line system. Nearly all utilities make annual reports to their State or other regulatory bodies, in which are included statements of retirement appropriations. If these appropriations vary substantially from year to year under a policy of flexibility, a clear explanation of the reasons should be given in the reports. Subnormal or supernormal amounts should be so indicated, preferably with a clear statement of the goal of accumulation or other standard in effect and the period of years within which reconciliation is normally to be expected—all in accordance with earlier recommendations herein. In such a way controversy may be avoided in rate cases over normal retirement needs, and the criticism referred to will be answered. The commissions might well require that such explanatory statements be included in all annual reports, and they might also concern themselves with the fidelity with which stated policies were made effective over a period of years.

It has been claimed that a flexible system of retirements encourages scant attention in the immature years of a property, which must be made up through excessive charges in a later assumed period of decline following years of normal balance. Such reasoning, however applicable it may be to a typical industrial property, does not fit the normal utility which must grow without time limitations, constantly adding new elements and abandoning old ones, with no period when the property as a whole is new, mature, or old.

A Court Decision

An interesting case involving a novel interpretation of retirement provisions has recently been adjudicated. The United Railways and Electric Company of Baltimore applied to the Maryland Commission for an increase in fares. It included among its cost elements a depreciation annuity sufficient to retire property elements at their rate base value rather than their ledger value or cost. The latter practice has been customary and, in fact, prescribed by standard accounting systems. The company contended that the former method should be adopted in fixing fares, for the reason that the rate base value fixed by the Commission in an earlier proceeding was higher than the ledger value of many constituent elements, and that if elements installed years ago at prices substantially below those included in the rate base were now replaced at higher cost, the company's investment would be increased, but its rate base would remain unchanged. This process, if continued for a period of years until all pre-war property had been retired, would mean an increase of millions in investment, but no increase in revenue, assuming that the level of prices on which the rate base value was fixed remained unchanged. Without an increase in revenue, the company contended, it could not secure additional investment funds and was faced with deterioration of property and financial disaster.

The Commission refused to accept this contention and continued in substance a previous much smaller allowance for depreciation, which, incidentally, was a percentage of gross earnings. The company appealed to the Maryland Court of Appeals, and in a decision rendered July 16, 1928, its contention was sustained. In conformity with this decision, the Commission subsequently increased its depreciation allowance by about 85 per cent. The court in its decision used the following unmistakable language:

> To require the Company to sell its service at rates which made no provision at all for the replacement or repair of the property when worn out or obsolete, would be plain confiscation, and to require it to sell it at rates which make an inadequate provision for the return of its value, when worn out or obsolete as a result of public service, can be no less.
>
> Counsel for the Commission suggests that to restore value would be to "require the financing of additions to plant, to the extent of the excess of replacement over original cost of property replaced, by the public, which would in turn have to pay a return on the capital thus required." The meaning of that suggestion is not altogether clear, but if it is that the Company is entitled to the return of anything less than the value of its property it cannot be sustained. Money deducted from earnings to replace equipment which has become worn out or obsolete, by other equipment of the same character and the same value, adds nothing to the Company's resources but merely keeps them at the same level.

The Commission, while accepting the ruling of the highest court of its State as above indicated, has not been convinced of its equity and has appealed to the Supreme Court of the United States for review. A writ of certiorari has been granted and a final authoritative ruling on the matter is expected within a few months.

While from an accounting point of view this decision may appear confusing, as a matter of fact it does not disturb fixed capital accounting because retired property may still be removed therefrom at its recorded value and the succeeding property entered at its actual cost. Although the ledger value may thereby continue to increase, the rate base value maintained in separate subsidiary accounts will not vary other than through changes in price level. The increase in cost and ledger value is provided for through the increased retirement appropriations and not from new capital.

In any event, where a rate base differing from fixed capital account has been established by a commission, a continuous record thereof should presumably be kept in order to maintain up-to-date values. The depreciation accounting program in question merely enlarges the purpose of this subsidiary valuation record, which, to be definitely useful, must, of course, be in sufficient detail to identify the value of each element to be retired.

Financial Advertising

One other situation in which accountants are interested should be mentioned. The financial statements published by many public utilities in connection with advertising of security issues and otherwise are commonly lacking in uniformity, particularly with respect to retirement or depreciation charges. Published income statements sometimes include such charges in operating expenses with or without designation of this fact and the amount; others insert them as deductions from income; and still others fail to designate any provisions for such purposes in their published statements.

Unless the amount of depreciation charges, regardless of where they appear in the income statement, is known and the balance sheet shows the accumulated reserves, the advisability of investment in an advertised security cannot be clearly determined. The practice is growing in utility circles of an income statement set-up in which the net income remaining after payment of operating expenses, taxes, and interest charges is added to the accumulated surplus, from which dividends and retirement appropriations are taken. This is a logical practice, at any rate where income is so subject to fluctuation that dividends or depreciation charges are not at times currently earned in full. So long as the State system of accounts permits and even encourages retirement appropriations from surplus, and this system continues in effect for the major part of the utility business, it would seem preferable to standardize published income statements accordingly.

Results of Accounting Standards

Neither of the two accounting systems, for depreciation and retirements respectively, have been in regular use long enough to permit an accurate survey of their effectiveness. The Interstate system has nominally been applied by steam railroads to rolling stock for a considerable period of years. Their practice has varied widely and there has been an obvious lack of enthusiasm on the part of railroad executives in making the system effective and definite opposition to its extension to other classes of railroad property. Only a few electric railways, engaged in interstate commerce, have applied this system to their equipment, with objection to its burdensome cost and inaccuracies and opposition to its more extended use. The State commissions have rarely enforced the depreciation requirements of the interstate system as they have applied it to intrastate operations.

The telephone companies generally throughout the United States have adopted the straight-line system, have used it successfully for a period of years, have accumulated very extensive useful life data which they believe to be reliable, and are heartily in favor of the refinements in effect and contemplated. The distinctive character of the telephone business, the unusual value of its service in relation to rates, ability to control retirements for non-physical causes and to find further uses for retired equipment, and other special advantages distinguish the telephone industry sharply from other utilities and render its experience of uncertain value to others.

The State retirement system has been in effect, increasingly, only since 1922. Obviously this period is too short for accurate judgment as to its effectiveness. The reaction from its users has, however, been favorable. It should be noted that this system is new only with respect to its standardization and official indorsement. It is, in substance, the system most commonly used since the origin of depreciation accounting. Where it has been consistently used it has promoted stability of business and credit, expansion of facilities, and community development. This system, therefore, may claim for itself demonstrated success, based upon long practical experience with its essentials. In this era of emphasis on good public relations between utilities and the communities served leadership in good citizenship is

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The Flexible Cord Problem

As Viewed by the Electric Lighting Company

By ARTHUR P. GOOD

FLEXIBLE cords will continue to be used for conducting electricity as long as they offer to the user the convenience that they do today in supplying energy to electrical appliances, both motorized and non-motorized, and for electric lighting purposes.

A difficulty that seems to have been encountered through the use of flexible cord is the use of so-called substandard cord. I understand the term substandard, as applying to flexible cord, to mean that the insulation, that is the rubber insulation over the copper conductor, is very thin and of poor quality.

A second difficulty is the use of cord as line wire. In other words, cord is stapled to walls and base-boards, and run under carpets to supply electric energy between a fixture socket or a convenience outlet and a too far distant appliance.

As I understand it the chief duty of the members of the International Association of Electrical Inspectors is to guard the life and property of the citizens against mishaps occurring from the use of improper electrical appliances and electrical material.

Therefore, in viewing any specific one of your problems, it would seem fitting to determine just how hazardous from a fire or life standpoint is the particular material or appliance, or method of installation under discussion.

IT was felt that a record of five years of electrical fires and fatal electrical accidents occurring in the city of Chicago from the use of flexible cord might serve as a cross-section of the situation and give us some idea of just how hazardous these cords are. I give you here this five year record.

A recent survey indicates that 96 per cent of the 790,000 homes of Chicago are wired for electricity. The estimated population of these homes is 3,033,600 based on a total population of 3,250,000.

It would seem conservative to estimate that 50 per cent of these homes have flexible cord installed, which is either substandard or the installation of the cord is not in accordance with the electrical code.

On this basis there are 379,200 homes exposed to the fire hazard, which is considered to be present on account of defective cord conditions. Exposed to possible life hazards in connection with the cord in these homes are 1,516,800 persons.

Mr. Good is Chief Inspector for the Commonwealth Edison Company, Chicago, and Chairman of the Wiring Sales Committee, Commercial National Section, N. E. L. A. This paper was read on July 29th before the Convention of the Western Section, International Association of Electrical Inspectors, held at Detroit

Let us now look back to our five-year record of electrical fires and fatal accidents attributed to defective cord conditions. For the five years, beginning 1924 and ending with the year 1928, there occurred in Chicago 353 fires attributed to flexible cord. The total number of electrical fires over this same period was 2288. Therefore, the cord fires are some 15 per cent of the total electrical fires. The data available does not indicate where the cord fires occurred but it is safe to assume that at least 50 per cent, and perhaps more, of them occurred in commercial or industrial establishments.

During this same five-year period, there were three fatal electrical accidents which could be attributed to flexible cord. The total fatal accidents that occurred during this period were 77. The flexible cord fatalities were, therefore, something less than four per cent of the total fatalities. Of the three fatal accidents occurring over a period of five years, only one occurred in a home. In none of these accidents was the cord used as line wire, that is, stapled or permanently fastened to the building structure. In all cases, it was being used purely as a portable cord. The only statement that is made regarding the cord in connection with these accidents was that the cord was in a defective condition, therefore we cannot assume that the cord was substandard. It may just as likely have been a standard piece of flexible cord which through usage had become abraded, exposing the copper wire.

Considering the fact that these three accidents occurred over the long period of five years in a city with a population of 3,250,000 persons, and further considering the fact that it could not be established that the cord, itself, when new, was defective, in other words—substandard—it would seem that from a life hazard standpoint cord accidents could be considered negligible.

ASSUMING, as stated above, that one-half of the electrical cord fires over the 5-year period could be attributed to use in the home, there occurred in the 758,400 wired homes in Chicago, 175 fires attributed to the use of flexible cord. Of this number 20 per cent is due to cord troubles other than substandard material or cord used as line wire. The annual percentage, if we may speak of it in this way, in homes exposed to cord fires is something like 9/1000ths of one per cent. In these 379,200 exposed homes, there are housed, as given above, some 3,033,500 persons. Considering the fact that a very appreciable percentage of this number of persons must, at least, occasionally, handle and perhaps frequently abuse the flexible cord installed in their homes, is it not a very excellent record for these cords that such an infinitesimal number of fires are annually occurring from them in the city of Chicago, and cannot we assume that these Chicago data give a cross-section picture of the situation throughout the United States? I, in no way, desire from this statement or the figures submitted, to attempt to brush aside as of no consequence the fires and the deaths that have occurred through the use of flexible cord, but I do think that our old bugaboo "Apprehension," is again at work in connection with the flexible cord situation. Indeed, I believe that if it was a matter of great moment, the citizens of our cities and towns throughout the United States would be the first ones to be concerned. I have noticed when any agency works toward the destruction of the citizen's life or his home, he immediately rises up and attempts to do everything in his power to bring about corrective measures. I cannot feel that he is at all alarmed by the comparatively few deaths and few fires that have occurred by the use of flexible cord in his home; otherwise he would not continue to be so little concerned as to the kind of cord which he purchases or the manner in which he installs it.

However, I do not want you to feel that the electric lighting companies are not doing what they can to lessen whatever hazards there may be in connection with the use of this material.

When I received word of what you would like me to talk about today, I immediately wrote a number of letters to various acquaintances of mine in the different utilities throughout the United States, asking them what measures they were taking to bring about the manufacture of better flexible cord and the proper use of such cord. I will give you excerpts from some of the replies that I received. Perhaps there is no better place to begin than by quoting from a letter from the very progressive lighting company of the city which is our host. "We are making quite a serious effort to put adequate wiring into new residences by education of contractors, builders and architects. Our city rules require a convenience outlet for every fifteen feet of gross wall space in living-room, and one every twenty feet in all other rooms other than closets and halls."

HERE is one from Massachusetts with regard to flexible cord and cord sets:

"We endeavor to use and sell only those which have the underwriters' approval."

Here is one from Philadelphia concerning the two problems of the use of substandard cord and the promiscuous use of flexible cord in place of approved circuit wiring:

"I find that our company has taken definite steps in contacting with the jobbers and dealers and our local Electric Club to secure their assistance along these lines. Our company is selling cords at cost, as an incentive to prevent the use of substandard material."

Here is one from the biggest lighting company in the State of New Jersey:

"We have persistently refused to sell appliances that have substandard cords and plugs unless the cords and plugs were changed. When we took on the sale of a well-known and widely advertised make of electric flat iron, we required the manufacturer to supply us with a cord and plug in accordance with our specifications, which demanded a cord quite different from the cord regularly supplied with the iron."

I think most of you know about the efforts that have been made in New York City to have electrical dealers and department stores unite in refusing to market substandard flexible cords.

Officials of these concerns and department store managers were interviewed and told about the hazards in connection with the use of this material. These educational efforts were made by representatives of the underwriters and the electric lighting companies.

I could give you comments from a number of other letters that I received from electric lighting companies, but every one of them is along the same line, namely, that they are doing what they can to cooperate in this situation through education of contractors, builders, and architects; through conferences with electric dealers and department managers of stores which handle electrical merchandise.

SOME of these letters state that they would be willing to make efforts, but that they are at a loss to know just what to do to prevent the use of the wrong kind of cord and to prevent the employing of cord in the wrong manner.

I feel, from comments I have heard, that the results of conferences arranged to try to educate or persuade dealers and department store people and other concerns from handling substandard cords are not entirely successful. In some cities where this has been tried, it has been found, in spite of continuous effort, to be rather a failure, for as long as someone sells this substandard material, others feel that to compete they also must sell it, and the result is, that the individual or firm that wants to go alone and not market this material is penalized, and loses in consequence a certain amount of business.

Electrically, from time to time, we condemn the five and ten cent stores for selling the wrong kind of a flat iron or a waffle iron, or a toaster and for marketing electrical materials which are stated to be flimsy in their construction.

All of these wiring jobs that we have done since June, 1928, have been installed by using non-metallic sheathed cable. We have installed 30,356 outlets up to date. This wiring business amounted in money to $180,000. When we called on the householder to install or estimate in connection with additional convenience outlets, other items generally occurred to him, necessitating, in addition to the convenience outlets, other wiring and fixture installations. On this additional "picked-up work," as you might call it, there has been a total of $74,597 in wiring and $28,288 in fixtures over a period of fifteen months. The total amount of dollars received for this work was $282,885, a very large portion of which was received by the electrical contractors of Chicago, who installed this work. Electrical labor also received its full share, to the amount of some $200,000 paid to the wiremen by the contractors.

THE users of electricity who had these additional conveniences installed are now enabled at a very reasonable expense to have their homes better lighted, and to use more appliances, and to use them more conveniently.

Not taking into consideration the additional appliances which we know have been purchased by those who had these outlets and other wiring installed, we estimate that the additional income to us over a period of fifteen months from the use of electricity on this new wiring amounts to some $33,750. All concerned have profited, and we maintain that our customers have a safe and permanent wiring installation through the use of this less expensive wiring material. We may safely say that if this economical material had not been available, the Commonwealth Edison Company would not have conducted the campaign that was conducted, and the result would have been that a number of our customers would not now have the convenience of some 30,000 additional outlets and the wire manufacturer, the fixture manufacturer, the electrical contractor, the electrical worker, and the electrical lighting company would be together some $316,600 poorer, and the citizen who had this work installed would, in the meantime, have gone down to the five and ten cent store, bought and installed 25 feet of substandard flexible cord from a multiple plug sticking out of the one convenience outlet in his living-room, tacked it along the baseboard by driving an upholster tack between the two flexible wires and thence under the carpet, 25 feet to the new radio set.

I personally have purchased sockets, plugs, flexible cords and other materials in the five and ten cent store, and why did I purchase them? Because I could get them at what I considered was a reasonable price, and because this material was convenient for me to use in my home in connection with my electrical installation.

I think in place of condemning the five and ten cent stores, they deserve a lot of credit by providing economical materials and through the use of these materials encouraging the growth of the use of electricity. At least, this is the way that the electric lighting companies feel about it, and here we have to my mind the keynote of the whole situation.

The American citizen will continue to use in his factory, in his shop, in his home any appliance and any material which he can purchase at what he considers a reasonable price and which he can easily install.

As long as this citizen can economically purchase and easily install flexible cord, he will continue to buy and wire his home in an improper way with this cord, and as long as there is a demand for the cord, you will always have such competition in the manufacture and sale of it, as will bring on the market the so-called substandard type, and quite naturally the purchaser will buy such cord and will use it. If, therefore, you really desire to hit the substandard cord below the belt and to not make it worth the time and energy of the citizen to use such cord as line wire, then you must give him a substitute. Give him less expensive standard wiring material that he may either install himself, in a proper manner, or if he elects to have it installed, he can have such an installation made at a reasonable expense. If you wish to educate the citizen in what he must not do, or what he must use or must not use in his electrical life, then do everything that you can to popularize the use of electricity. A wider and wider use of electricity will in itself prove of inestimable educational value.

THE extended use and the ever extending use of appliances have done more than any other factor to put the citizen in a frame of mind where he is no longer afraid of electricity but at the same time understands its possible hazards. Radio, today, has greatly helped to accomplish this very thing, and other immensely popular usages of electricity will be with us in ever increasing numbers in the future.

The electric lighting company, due to its ever increasingly close contact with the public, believes itself in a unique position as far as sensing the electrical desires of its customers. We believe that the householder wants the rooms of his home properly and well-lighted. He wants to have many switch outlets so as to easily and conveniently control such lighting. He desires to use many appliances, and if he is to use them conveniently he must have outlets so installed that there will be no incentive on his part to go to the much maligned five and ten cent store. He has no desire to endanger the lives of his family or to burn down his house. He does not want dangerous or so-called cheap electrical material, neither does any one want or advocate the use of such material who has at all, today, any interest in the electrical business. It is the duty of you men to see that he does not use or install dangerous electrical material, but please watch out and do not let the old bugaboo called "Apprehension" so dictate your policy that you are unwilling to step side by side with the other great advances being made in the electric art, and by so doing, not permit the use of more economical wiring materials and methods of installation, except through such restrictive measures as render the use of such material and installation practically abortive. In other words, give the user of electricity a reasonably priced, good wiring material. Show him how to properly install this material, and experience has shown that he will buy it and will use it properly, and will no longer feel the need of using the wrong kind of material or improperly installing it. Please understand that when I have referred to the home use of electricity, that exactly the same statements would apply to its use in the factory or in the store.

The Commonwealth Edison Company of Chicago so strongly felt that this idea was a keynote one, that we have since June, 1928, conducted a wiring campaign throughout Chicago in connection with residential occupancies. The electric lighting companies have consistently advocated the use of economical wiring material, such as non-metallic sheathed cable and thin wall conduit or so-called electrical metallic tubing.

In a broadminded manner, the Department of Gas and Electricity of the City of Chicago is permitting the use of non-metallic sheathed cable, and since June, 1928, the Commonwealth Edison Company has conducted a home-wiring campaign for more convenience outlets. We have advertised this campaign through newspapers, on billboards, through small folders being inclosed with the monthly bills to the consumer, in fact in every conceivable way we have advocated more and many additional convenience outlets. We do not do the actual wiring; we solicit the business, take the order, finance it, but the electrical contractors of Chicago actually do the work and are promptly paid for it upon its completion.

The users of electricity who had these additional conveniences installed are now enabled at a very reasonable expense to have their homes better lighted, and to use more appliances, and to use them more conveniently.

NOT taking into consideration the additional appliances which we know have been purchased by those who had these outlets and other wiring installed, we estimate that the additional income to us over a period of fifteen months from the use of electricity on this new wiring amounts to some $33,750. All concerned have profited, and we maintain that our customers have a safe and permanent wiring installation through the use of this less expensive wiring material. We may safely say that if this economical material had not been available, the Commonwealth Edison Company would not have conducted the campaign that was conducted and the result would have been that a number of our customers would not now have the convenience of some 30,000 additional outlets and the wire manufacturer, the fixture manufacturer, the electrical contractor, the electrical worker, and the electrical light company would be together some $316,600 poorer, and the citizen who had this work installed would, in the meantime, have gone down to the five and ten cent store, bought and installed 25 feet of substandard flexible cord from a multiple plug sticking out of the one convenience outlet in his living room, tacked it along the baseboard by driving an upholster tack between the two flexible wires and thence under the carpet, 25 feet to the new radio set.

Depreciation Accounting Methods for Public Utilities

(Continued from page 660)

of outstanding importance, and any factor tending to promote rather than retard progress should not be ignored.

Conclusion

The two accounting systems discussed herein are alike to the extent that they seek to stabilze certain costs over a period of years. The costs in question are, however, quite different, one including only depreciation, the other embracing the over-all cost of service, in which retirement charges are an important stablilizing factor. The reserves which both systems provide are usually quite different in size, but even if they were the same, the methods of accumulation are unlike, being uniform and flexible respectively. This is the essential difference. Each system is open to objections in its operation. The Interstate depreciation system is based on assumption as to useful life, which the outstanding executive and technical talent in the industry believes to be untenable now and to continue so until engineering and economic developments have become stabilized beyond present expectations. The State retirement system is vulnerable in its flexibility, which, without wise supervision, may be carried to unsafe extremes. But this defect can be remedied by some definite program of systematic flexibility such as is suggested herein. As between two systems with defects which are for the time being uncorrectible and correctible respectively, the choice should be obvious.

A Friendly Neighbor in a Time of Need

A Power Company Provides Water for a Drought Suffering Section

By J. B. MAHONEY

Superintendent of Power, New England Power Company

OWING to the unusual drought experienced in New England throughout the past several months, the water storage supplying the Shelburne Falls Fire District, so called, became very serious. The Shelburne Falls Fire District is a corporation made up of the thickly populated portions of the towns of Shelburne and Buckland, Mass., and under conditions existing during a normal year, the water supply is unexcelled, it being secured from the Fox Brook located in the hills just north of the community and giving a static head of approximately 300 feet. It was first put in operation about 1911, and in the succeeding eighteen years has been ample for the villages.

During the months of May, June, July and August, 1928, an average rainfall per month of 5.39 inches fell. During the same period in 1929, however, the precipitation dropped off to an average of 1.84 per month, or approximately 34 per cent of the rainfall of 1928. The sixty-year average for the same four months was 3.93 inches, according to records available, being over 50 per cent greater during the sixty-year period than was experienced the present season.

AS a result of this unusual shortage in precipitation, the storage in the Shelburne Falls reservoir began to get serious the latter part of July and the first of August. The residents were warned to be as economical in the use of water as possible and were restricted to the use of water for anything but absolute essentials. The watering of lawns and gardens as well as washing of automobiles and other vehicles were absolutely forbidden. Even with this curtailment the situation became more serious daily, and by the second week in August the shortage became so acute it was deemed advisable to notify the State Board of Health of the situation. A couple of representatives from the State Board visited Shelburne Falls on August 15 to investigate the situation and determine whether or not some other source of water could not be secured immediately to temporarily alleviate the situation. After going over the grounds they found the only available water was in the Deerfield River, and owing to the fact the north branch of the Deerfield which empties into the main river at Shelburne Falls was very low and badly contaminated by sewage from the villages of Jacksonville, Colrain, Griswoldville and Shattuckville, it was unfit for use in the immediate vicinity of Shelburne Falls and Buckland. Their attention was called to the fact that our No. 4 Hydro-Electric installation made use of a tunnel, the intake of which tapped the Deerfield River above the mouth of the North River, and if the New England Power Company would give its consent to secure a supply from one of its penstocks at No. 4 Station, a satisfactory source of pure water would be available.

THE State officials, together with representatives of the Shelburne Falls Fire District, got into immediate touch with the writer and asked if such a plan would be possible and feasible. This was the first knowledge we had of the situation being so acute and we assured the officials that the New England Power Company would be only too glad to do anything within its power to render assistance.

The writer went over the situation in person and ascertained it would be possible to use a 3-inch existing connection from one of our turbines under a head of approximately 65 feet for pumping to the town water mains and reservoirs. Later on the officials experienced difficulty in securing a proper pump and, upon being advised of the trouble they were having, we immediately made arrangements to send a two-stage 100 hp. 4-inch pump from our plant at Bellows Falls, Vt. The request first came to the New England Power Company about 4 p. m., and by late evening we had transported the pump from Bellows Falls and set it up at No. 4 Station, and by noon of the following day it was fully connected, ready for service. In the meantime, the water commissioners had purchased sufficient pipe to extend across the Deerfield River from No. 4 Station and tap the water main which extends along the Shelburne Falls-Colrain highway. Considerable time was being lost in installing this pipe, so the New England Power Company again threw in its organization to rush the installation of the pipe, and about 4 p. m. of August 16, or twenty-four hours after the emergency was first made known to us, we had transported a complete pumping plant and were delivering about 300 gallons per minute, or at the rate of approximately 400,000 gallons per day, to the community. The average daily water consumption of the community is approximately 150,000 gallons, so that we are not only supplying the normal consumption, but storing considerable in the reservoir as well; in fact, within six hours from the commencement of pumping we had raised the water level in the reservoir some 50 inches. The water has been analyzed by State chemists and found to be pure and fully satisfactory for drinking purposes. The chlorinating process is an additional precaution, considered advisable by the State Board of Health.

A FEW days after the pump was installed and the local officials had a demonstration of its capacity and dependability, all restrictions on the use of water in the community were lifted. As matters now stand, the community has, in effect, a modern pumping station capable of delivering approximately 300 per cent more water than its daily consumption, completely housed in a modern power station with constant attendance at absolutely no investment cost.

It is interesting to note that within the short space of three years this community has passed through two emergencies, brought about by the elements, and on each occasion the New England Power Company has brought it through without loss to property, life or health.

Were it not for the trained organization the New England Power Company maintain at Shelburne Falls, the knowledge, ability and willingness to serve as well as the resources of the New England Power Company this community would have, without doubt, been wiped out of existence during the floods of 1927, and today would be in a most precarious situation owing to the fact there is no other water supply available at the present time, aside from that in the Deerfield River, which all comes from the storage waters impounded by our storage dams on the upper Deerfield.

National Executive Committee Meeting

The 1930 N. E. L. A. Convention Will Be Held in San Francisco

A DEFINITE decision to hold the 53rd Convention of the National Electric Light Association at San Francisco the week of June 16, 1930, was reached at the first Executive Committee meeting of the administrative year held at Chicago, Sept. 25. The Convention will be held in the San Francisco Exposition Auditorium.

The selection of the convention place and date, the consideration and approval of the association's budget for the current administrative year and reports from the four National Section Chairmen, Geographic Division representatives and Special National committees was the chief business of the meeting at which Chairman M. S. Sloan presided.

The National Executive Committee meeting followed meetings held by the Women's Committee, the Executive Committee, Accounting National Section and the Customer Ownership Committee on Sept. 23, and meetings of the Executive Committee, Public Relations National Section and the Insurance Committee on Sept. 24.

The treasurer's report and the budget for the current year were presented to the Executive Committee by Secretary Marshall in the absence of Treasurer P. S. Young. The treasurer's report, which showed the finances of the Association to be in a satisfactory condition, was approved as presented, as was the budget after some discussion and revision.

Secretary Marshall reported that the total membership of the Association as of Sept. 20 was 21,626, a net increase of 848 since the report of May 29.

In reporting to the committee, Managing Director Clapp said in part: "This year we have made a decided step forward in the matter of the personnel of committees, at the suggestion of Mr. Sloan. In March we approached executives of the member companies, sending a letter inclosing a list of the various committees upon which members were desired, with a request that they indicate those men they wished to have serve on the respective committees. The point of view back of this procedure is that the executive knows his personnel and knows the line of development and present situation, and that he is the one to indicate the members to serve. We were gratified with the large response this method secured from executives, and are confident that it has resulted in a stronger, more authoritative and enthusiastic group in the personnel of the organization than ever before."

Mr. Clapp also reported that the rebuttal case on behalf of the Association had been prepared for presentation to the Federal Trade Commission. Due to the illness of Judge Healy, counsel for the Commission, it is probable that it will be the first of the year before the rebuttal case can be presented.

Geographic Divisions

Representatives from the several Geographic Divisions reported that divisional work is fully organized and is proceeding in fine fashion. Several of the divisions brought out in particular that rural electrification is progressing rapidly, and that plans for the celebration of Light's Golden Jubilee are being widely made.

J. F. Ford, reporting for the Pennsylvania Electric Association in the absence of President F. R. Phillips, stated that electric service was extended in 1928 to 20,000 rural customers in Pennsylvania at an expenditure of over $3,000,000. L. H. Herrington, president of the East Central Division, reported that conditions in the industry in his division are getting better every day in all respects.

G. C. Neff, president of the Great Lakes Division, said that 90,000 farms in his division are connected to central station at this time. In 1923 there were 15,000. Committees of the division are cooperating in the celebration of Light's Golden Jubilee and are doing their best to give a good account of themselves. A food preservation program has been planned, and the Commercial Section has planned a lamp campaign. He also reported that the constitution of the Great Lakes Division has been revised to accord with the constitution of the N. E. L. A.

A. E. Bettis, President of the Middle West Division, gave a comprehensive summary of the plans for the various committees of his division. C. H. Hodskinson, President of the New England Division, and T. T. Parker, President of the North Central Division, both reported their organizations in fine shape and assured the support of all national programs.

M. L. Hibbard, President of the Northwest Division, told of the success in Washington, Oregon, Utah, Montana and Idaho of electric water heating and electric cooking. He also requested that the National Association cooperate in solving the problem of radio interference. Managing Director Clapp replied that provisions had been made in the budget for an investigation of this problem and that it was hoped that the solution would be found applicable in other sections of the country.

E. B. Criddle of the Pacific Coast Division reported that work is progressing favorably in all activities of his division. In referring to rural electrification, he stated that "during the last year we published what we believe to be a very valuable book on farm electrification. As, in our division, the wide scope of territory includes farms from mountain to desert, it covers rural electrification from the broadest possible standpoint. Our goal is to have every farmer use every type of electrical service possible on the farm, which includes, of course, the farm home. We hope to have farm homes as completely electrified as other homes."

O. A. Weller, secretary of the Rocky Mountain Division, T. H. Tutwiler, President of the Southeastern Division, and Fred W. Insull, President of the Southwestern Division, report excellent work being done in their divisions.

National Sections

Harry Reid, Chairman of the Public Relations National Section, reported that all meetings of committees in his section had been very successful and that the organization of the section is complete. He spoke particularly of the National Public Speaking Contest under the direction of the Public Speaking Committee, and asked for its hearty support.

Marshall E. Sampsell, Chairman of the Commercial National Section, reported that the Rate Committee of his section has been eliminated and that two representatives of the Commercial Section will serve on the Rate Research Committee instead. All indications point to greatly increased activity in the commercal field.

W. R. Emerson of the Accounting National Section reported that many new activities suggested by last year's reports will be taken up by the several committees of the Accounting Section.

A. D. Bailey of the Engineering National Section reported that the section is functioning completely. Group meetings will be held shortly, serial reports and other activities of the section are being turned out regularly by the various committees.

Electrification of Steam Railroad Committee

Chairman Budd of this committee told of the excellent work accomplished last year by this committee and discussed plans for the current year. The question of a paid full-time secretary for this committee was raised. Action was deferred on this question until the matter has been placed before the Public Policy Committee.

Prize Awards Committee

Chairman Onken reported that this committee is giving serious consideration to all awards administered by the Association and that it was felt that it would be opportune to place these awards on a higher, broader and more stable basis. Towards this end he offered the following suggestions:

"1. Funds to provide for such awards should be placed in trust to assure availability from year to year.

"2. Such awards should be effective for a stated period of years or for such period as the trust is definitely established.

"3. A committee should be provided.

"4. This committee of the Executive Committee should confer with the donors.

These suggestions were approved.

Civic Development Committee

Chairman Reynolds reported that with the completion of the report of migration and change of industry made jointly by the Metropolitan Life Insurance Company and the committee, the committee finds itself able to devote more time to the fundamentals of its activities. Work contemplated by the committee include a study of the results of the civic activities of the companies which have had a long successful career in industrial development. Other work will be the preparation of a report which will tell how local companies may tie themselves in with civic activities, including industrial activities of their communities.

Educational Committee

Chairman Jenkins reports that the committee has just completed an extensive program in the revision of home study courses. An advanced accounting course, which had been in preparation for a year or more, has been made available to students. During the summer the course in practical electricity was completed and the committee is now ready to take up the revision of the commercial course. He reported that during the past year there has been an increase of 54 per cent in sales of home study courses over previous years.

Rural Electric Service Committee

Chairman Holcomb referred to the work that is being done on the national project located near Washington. It is thought this work, the chairman stated, will rapidly develop into something of great importance in the matter of rural electrification. The activities of this project will be national in scope. Work will be carried on there that cannot be accomplished in State projects.

The invitation to hold the 1930 convention in San Francisco was extended by J. P. Coghlan and was seconded by Mr. Criddle, President of the Pacific Coast Division.

Sixteen applications for Insull Medals for resuscitation by the prone pressure method were approved. These were as follows:

Leo Nedvidek, General Electric Co., Schenectady, N. Y.

George T. Tomlinson, Consumers Power Co., Jackson, Mich.

Wm. F. Meier, Illinois Power and Light Corp., East St. Louis, Ill.

Joseph Clyde Heaslet, San Joaquin Light and Power Corp., Fresno, Cal.

W. T. Bussell, Southern Sierras Power Co., Riverside, Cal.

Harry W. Hennen, Union Gas and Electric Co., Cincinnati, Ohio.

Otto Olson, Michigan Public Service Co., Sheboygan, Mich.

Alta L. Crawford, Illinois Power and Light Corp., Eldorado, Ill.

Francis Benson, Wisconsin Power and Light Co., Monroe, Wis.

Edward Larnce Brasel, Central Illinois Public Service Co., Springfield, Ill.

Bruno Manel, General Electric Co., Pittsfield, Mass.

Leonard Klausser, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

E. M. Wiseman, Los Angeles Gas and Electric Corp., Los Angeles, Cal.

First Aid Team, Line Department, Southern Colorado Power Co., Pueblo, Colo.

A resolution on the death of the late Harry M. Edwards of the New York Edison Company was passed by the Committee. The resolution follows:

"WHEREAS, the National Executive Committee of the National Electric Light Association at its meeting in Chicago, Ill., on Wednesday, Sept. 25, 1929, has learned with profound regret of the death of H. M. Edwards, a member of the association since 1906, the first chairman of the Accounting National Section 1908-1909 and again chairman of the section for three years during the period 1913-1916, and a member of the National Executive Committee since 1924,

"NOW, THEREFORE, BE IT RESOLVED:

"THAT, by the death of H. M. Edwards the National Electric Light Association has lost one enthusiastic supporter and friend and one of its pioneers, who not only labored to fit himself for increased responsibility in the industry and with the New York Edison Company, of which he was vice-president, but also did much in advancing and perfecting the accounting and fiscal operations of electric light and power companies thus adding prestige to his company, the electric light and power industry and the National Electric Light Association, all of which he so faithfully served, be it

"FURTHER RESOLVED, that this expression of our sorrow and regret be incorporated in the minutes of this meeting and that a copy thereof be sent to the family of the deceased.

Henry M. Edwards

HENRY MOORE EDWARDS, vice-president of the New York Edison Company, in charge of the Accounting Department, died suddenly on the night of September 18 at his home, 42 Woodland Avenue, Glen Ridge, N. J.

Harry Edwards was spoken of as the Dean of the Accounting Section of the National Electric Light Association. He was largely responsible for its organization in 1908 as one of the distinct divisions of association work, and was its first chairman.

Mr. Edwards was born in New York City on July 28, 1860. He began his career in the electrical industry in 1889 as accountant with the Manhattan Electric Light and Power Company. In 1901 he handled the financial operations relative to the consolidations of all the companies forming the present New York Edison Company, and was the auditor from 1901 until 1924, when he was made vice-president, accounting, the title he held at the time of his death.

He was vice-president and director of the Yonkers Electric Light and Power Company; secretary, treasurer, and a director of the Edison Light and Power Installation Company. He was a member of the Accounting Advisory Committee of the system of five companies of which M. S. Sloan is president, and also a member of the Standardization Committee of these companies.

At the time of his death Mr. Edwards was a member of the Executive Committee of the National Electric Light Association, and was a member of several other important committees in the association. He was also a member of the New York Electrical Society, the New York Electrical League, the Academy of Political and Social Science, Chamber of Commerce of the State of New York, Merchants' Association of New York, and of the Edison Quarter Century Club.

Mr. Edwards was looked upon by the electrical industry as a wise counselor and willing cooperator. He was intimately concerned with the adoption of good accounting practices, the uniform classification of accounts and the development of utility rate systems. His wide experience in all branches of the industry gave him an understanding of the business that made him an extremely valuable committee worker, and his personality and disposition won him friendship and respect among a host of men. His life and work afford the highest example of an able utility executive devoted to his business and to the service it renders.

Service Suggestions

NATIONAL ELECTRIC LIGHT ASSOCIATION — COMMERCIAL NATIONAL SECTION
CUSTOMER RELATIONS COMMITTEE
H. T. EAST, *Chairman,* Public Service Co. of Northern Illinois, Chicago, Ill.
To formulate efficient methods of conducting relations between the customer, the public and the supply company, including such matters as taking applications in the office, forms, order routing, inquiries, complaints, meter reading, collections and credits

No. 76 — October, 1929

"Pay Bills Here"

Of Interest to Public Utility Cashiers

By H. T. East

Assistant to Vice-President, Public Service Company of Northern Illinois, Chicago, Illinois

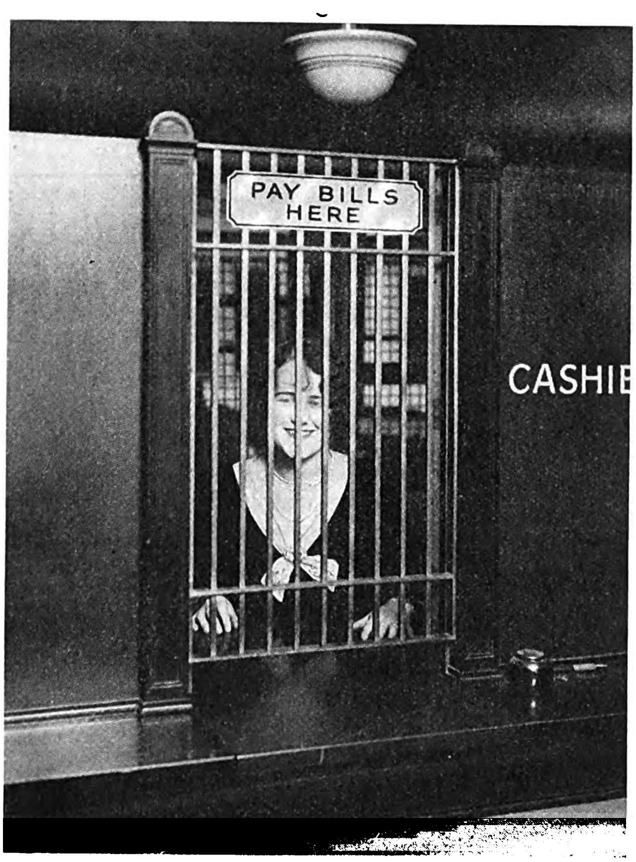
THE busiest, though not the largest or most finely appointed, drug store in an Illinois city prominently displayed this sign: "If the clerk fails to thank you for your patronage your purchase is free." The management meant it. If at any time any employee neglected to carry out the policy of the store, the patron was presented the article as a premium for the failure. Whether the management or delinquent clerk bore the burden I do not know, but it is certain that few occasions arose where the claim could be made. This innovation provided not merely a penalty for the establishment, but a constant reminder to patrons and store organization that every customer was entitled to courtesy as well as fair value in goods bought. Results: an ever increasing business in a highly competitive field, and contented customers. Here is a lesson for the light and power monopolistic business.

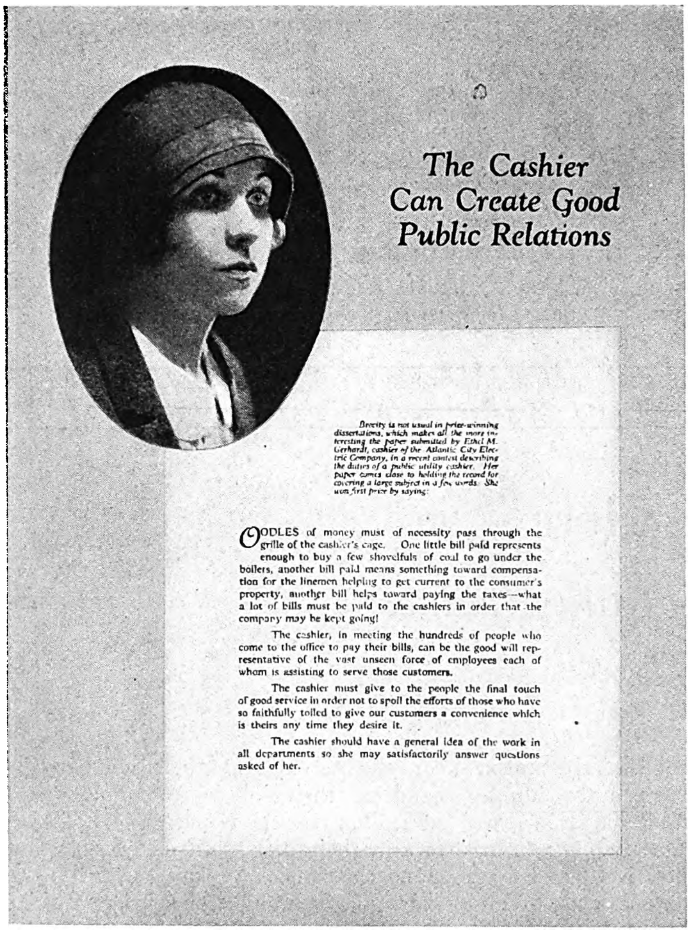
The greatest obstacle to better relations with our customers is, perhaps, the necessity for charging them for electricity. Since this commodity is unseen and mysterious to the lay person, the correctness of its measurement and billing is naturally subject to doubt. Patrons have access to an unlimited supply and literally help themselves to the amount used, never knowing until weeks later how much has been used or what the cost will be. It is only natural that many pay their bills reluctantly.

The paying of bills, even the admittedly just ones, is of itself hardly a procedure that engenders happiness or friendly attitude. This is human nature. It follows, therefore, that of all employees of public utility companies, the cashiers have one of the most difficult contact problems. By the same token theirs is the greatest opportunity to promote good-will and make friends for themselves and their company by handling their job in a manner which will please the many patrons whom they face in their daily routine. Suggestions along this line may prove helpful.

It goes without saying that cashiers should possess pleasing personalities and be courteous, sympathetic and patient. Each customer, regardless of age, sex, nationality, or color deserves to be greeted with a genuine smile. A genuine smile is not a grin or a facial contortion that is obviously a forced effort to look pleasant when you feel otherwise. Many persons could profitably spend considerable time before a mirror learning to smile, and indeed such practice will work wonders. As to courtesy, it is not enough to refrain from being discourteous; lack of courtesy, even while carefully avoiding discourtesy, is a great hindrance to creation of good-will.

Call people by their names. Most people feel flattered to be addressed by name, and this is a sure method of creating a good impression. If we were to analyze the reason why we trade at certain neighborhood stores we would find that it is more often than not because they know us and greet us by name. All contact employees cannot know the names of those with whom they deal, but the cashier has the customer's card (the bill) handed him or her immediately, and it can be used to splendid advantage. Cultivate the habit





The Cashier Can Create Good Public Relations

Brevity is not usual in prize-winning dissertations, which makes all the more interesting the paper submitted by Ethel M. Gerhardt, cashier of the Atlantic City Electric Company, in a recent contest describing the duties of a public utility cashier. Her paper comes close to holding the record for covering a large subject in a few words. She won first prize by saying:

OODLES of money must of necessity pass through the grille of the cashier's cage. One little bill paid represents enough to buy a few shovelfuls of coal to go under the boilers, another bill paid means something toward compensation for the linemen helping to get current to the consumer's property, another bill helps toward paying the taxes—what a lot of bills must be paid to the cashiers in order that the company may be kept going!

The cashier, in meeting the hundreds of people who come to the office to pay their bills, can be the good will representative of the vast unseen force of employees each of whom is assisting to serve those customers.

The cashier must give to the people the final touch of good service in order not to spoil the efforts of those who have so faithfully toiled to give our customers a convenience which is theirs any time they desire it.

The cashier should have a general idea of the work in all departments so she may satisfactorily answer questions asked of her.

Near the cashier's window in the commercial offices of the various operating companies of the American Gas & Electric Company appears this poster carrying a prize-winning essay by Miss Ethel M. Gerhardt. This poster does its bit to assist in creating good public relations.

of calling customers by name when occasion permits.

Common courtesy demands that each and every person be thanked upon completion of a transaction. Most cashiers will stoutly contend that this idea is not new, that they have always done it. To study this question we have lingered around dozens of cashiers' cages in various parts of the country, and with very few exceptions all cashiers went through the motion of saying "Thank You," but a woefully small number accomplished anything through their efforts. Mumbled, unintelligible words, uttered nine times out of ten while looking at the bill or cash box. It is far better to keep still than to utter the lie that your voice, manner, or expression exposes. Look up, smile, say, and mean *"Thank You."* By so doing you improve your own manner as well as create friends for yourself and your company.

Efficiency in handling stubs and cash in the presence of customers begets confidence in you and your company. A speedy, accurate, calm, collected procedure should be developed by those who receive the customer's money if they are to be considered good cashiers. People do not like to see careless and "sloppy" handling of money, particularly that which was recently theirs.

Cashiers sometimes are targets for abuse from certain types of customers even before they are given opportunity to refer the case to the customers' service or adjustment department. Steps must be taken from time to time to impress upon them that any such remarks, criticisms, or abuses from a disgruntled customer is directed not at them personally, but at the company which they for the moment at least personify. Unfortunately race, color, or social status often is basis for the wrong attitude, although more than usual care should be displayed in handling such contacts. Disregarding such conditions is a mark of ability.

Few people have not at some time had the experience of waiting in a store while clerks were plainly not engaged in things they could not leave. This is very annoying. Then, too, being waited upon by a person whose attention is largely given to a fellow employee or even to another customer is a just cause for annoyance. Every patron deserves the undivided attention of the cashier until the transaction is completed, and where it is absolutely necessary to take temporary leave, such as to answer the phone, a mannerly excuse cannot be omitted without overstepping the bounds of courtesy.

Good taste in dress and personal neatness are too well understood to require further comment.

Most utility cashiers are women, and it should be natural for them to represent the company in a pleasant, courteous manner. People expect more of that sort of thing from women, and any deviation from expected standards seems worse than if committed by a mere man.

Cashiers have important positions in the light and power business. The manner in which they handle their duties has a direct bearing upon the attitude of the public toward the company. Any steps which are taken to impress this fact upon the great army of men and women who receive from the public payment for the service rendered will aid in improving customer relations.

Additional Copies?

INVESTIGATION shows that only a comparatively small number of the men and women of the light and power industry who are interested in the subjects covered by Service Suggestions receive them. To meet the situation, Service Suggestions are reproduced in loose leaf form. Copies may be ordered direct from the office of the chairman. A charge of five cents is made to cover the cost of reproduction.

Any desired number of copies of an issue may be ordered or a standing order can be placed for a specified number of additional copies each month. Standing orders may be placed on an annual basis to save the annoyance of remitting small sums each month.

The subjects covered in recent issues were:

63—Courtesy Letters.
64—Tree Trimming from the Public's Viewpoint.
65—The Telephone as a Service Medium.
66—Handling Requests for Discount Allowances.
67—Informing our Customers about our Business.
68—Training Employees in Customer Relations.
69—Records that Speed Service.
70—Employee and Consumer.
71—Correspondence for Good-Will.
72—Teaching Customers to Read Their Meters.
73—Mechanics of Correspondence.
74—The Bill Jones Idea.

H. T. EAST, *Chairman,*
1427 Edison Building,
Chicago, Illinois.

Electrical Research Statistics

October, 1929

Issued Monthly by Statistical Research Department of the National Electric Light Association
420 Lexington Ave., New York, N. Y.

H. A. Snow, *Chairman, Statistics Committee, Accounting National Section*
Wm. M. Carpenter, *Economist*
H. S. Bennion, *Director of Engineering, N. E. L. A.*
Merle Rainey, *Statistician*

The National Electric Light Association, a voluntary organization of companies and individuals affiliated with or interested in the electric light and power industry, organized to advance the art and science of the production, distribution, and use of electrical energy for public service.

The Association maintains a Statistical Research organization which collects, interprets, and makes available basic statistical information on the electric light and power industry. The publications and services of this department are available to all those interested, on request.

Current Statistics of the Electric Light and Power Industry

(As of July 31, 1929)

The data here presented are for the total (100 per cent) electric light and power industry and are based on monthly reports received from some 400 companies, representing over 86 per cent of the industry.

	JUNE		Per Cent Increase	JULY		Per Cent Increase
DURING MONTHS OF JUNE AND JULY	1929	1928		1929	1928	
*Kw-hr. generated (net)	7,295,127,000	6,538,610,000	+11.6	7,534,129,000	6,664,443,000	+13.1
Add—energy imported from Canada and purchased from outside the Electric Light & Power Industry	174,276,000	203,264,000	−14.3	178,710,000	195,000,000	− 8.4
Less—energy used in electric and other departments	184,000,000	200,000,000	− 8.0	191,000,000	192,000,000	− 0.5
Total energy for distribution (kw-hr.)	7,285,403,000	6,541,874,000	+11.4	7,521,839,000	6,667,443,000	+12.8
Sales of energy in kw-hr. for:						
Farm service (not involving irrigation)**	7,900,000			7,264,000		
Farm service (involving irrigation)**	149,273,000			174,997,000		
Domestic service	687,055,000	583,844,000	+17.6	629,780,000	549,314,000	+14.6
Commercial service:						
Small light and power	1,038,088,000	881,489,000	+17.8	957,671,000	868,832,000	+10.2
Large light and power	3,917,620,000	3,435,668,000	+14.0	4,025,672,000	3,536,401,000	+13.8
Railways and railroads (motive power)	408,600,000	410,310,000	− 0.4	390,485,000	389,598,000	+ 0.2
Other sales to ultimate consumers	154,039,000	136,563,000	+12.8	143,231,000	130,298,000	+ 9.9
Total sales to ultimate consumers (kw-hr.)	6,205,403,000	5,447,874,000	+13.9	6,146,839,000	5,474,443,000	+12.3
Total revenue	$163,569,000	$149,210,000	+ 9.6	$160,400,000	$147,600,000	+ 8.7
Revenues from sales for resales and miscellaneous (included above)	9,520,000	8,130,000	.....	10,700,000	9,700,000	+10.3
DURING THE TWELVE MONTHS ENDING	JUNE 30, 1929			JULY 31, 1929		
*Kw-hr. generated (net)	87,013,886,000	....	....	87,883,572,000	....	....
Add—imports from Canada and purchases from outside the Electric Light & Power Industry	2,197,207,000	....	....	2,180,917,000	....	....
Less—energy used in electric and other departments	2,560,000,000	....	....	2,559,000,000	....	....
Total energy for distribution	86,651,093,000	....	....	87,505,489,000	....	....
New generating capacity installed (kw.) (7 mos.)		....	....	1,148,000	....	....
Number of new customers added:						
Farm customers	1,026,000			1,000,000	....	
Domestic customers		....	....		....	....
Commercial customers	120,000	....	....	116,000	....	....
Others		....	....	4,000	....	....
Total customers added	1,146,000	....	....	1,120,000		
Important factors:						
Percentage of energy generated by waterpower	38.3	....	....	38.7	....	....
*Average pounds of coal per kw-hr. generated	1.69	....	....	1.68	....	....
Domestic service (residential use):						
Average annual consumption per customer (kw-hr.)	478	....	....	482	....	....
Average revenue per kw-hr.	6.40c.	....	....	6.36c.	....	....

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*By courtesy of the U. S. Geological Survey with deductions for plants not considered electric light and power enterprises.

**As reported by 197 companies in June and 180 in July, included in figures below.

Basic Information on the Electric Light and Power Industry

As of July 31, 1929

The data included in this table are basic factors of the electric light and power industry and will be brought up-to-date at the end of each month and published in each issue of the Bulletin.

1. Value of plant and equipment (estimated)	$10,350,000,000*
2. Total generating capacity in kw.	28,588,000
Steam	20,707,000
Waterpower	7,570,000
Internal combustion	311,000
3. Total number of customers served	23,683,000
Farm customers (as reported by 180 companies only)**	(233,000)
Domestic customers	19,485,000
Commercial customers—	
Small light and power	3,620,000
Large light and power	545,000
Others	33,000
4. Population in electrically lighted homes	82,200,000
5. Percentage of homes which are served with electricity	67
6. Miles of transmission lines (11,000 volts and above) (circuit miles)	157,000*

*Subject to revision. **Included below.

Operations of the Electric Light and Power Industry During July, 1929

A FURTHER continuation of the high level of industry and trade is shown by the statistical summary of the distribution of electricity during the month of July. Since the first of the year the total sales of large industrial power were 25,924,000,000 kw-hr., an increase of 3,263,000,000 kw-hr., or 14.4 per cent over the corresponding period last year. Although an increasing irregularity in the activity of production may, perhaps, be noted when these figures are analyzed by the various regions of the country, a sustaining factor is to be found in the remarkable increase in the requirements of irrigation pumping. This is the direct result of the severe and long continued drought, which has reduced the proportion of hydro-electric generation to 38 per cent of total production, as compared with a high point of 43 per cent in May and 43 per cent in July of 1928.

Output Growing Faster than Revenues

While the growth of business—as measured by kilowatt-hours, the most picturesque but not, perhaps, the most important index—has shown a most satisfactory trend, there are, however, others to which attention should be directed at this time.

During the past year the growth in the *number* of new consumers has shown a striking change. As given in the table below, the number of new domestic users has increased, since January 1, by 413,000, or somewhat less than 60,000 per month. At this rate the total for the year will probably be in the neighborhood of 800,000, a decline of 32½ per cent from the 1,185,000 added during the year 1928.

This somewhat sensational loss of nearly 400,000 prospective domestic users over that shown the year before appears to be due, in large measure, to the decline in residential building, whose index stands at approximately the same percentage below 1928. Back of this, again, stand the facts that the post-war housing shortage has been made up, that tight money has further discouraged speculative residential construction and —most important of all—that there has been a progressive decline in the population growth of the country.

This latter fact is of considerable importance to the electric light and power industry, as it has all the indications of permanence and again emphasizes the fact that future expansion must result from a greater use *per customer* and not, as has largely prevailed in the past, from the mere acquisition of *more* customers. That this shrinkage in population growth (with its ultimate limitation of prospective consumer demand) is very real, has recently been illustrated by Dr. Dublin's conservative study, in which the falling birth rate and the stoppage of emigration have been shown as playing important parts.

Coincidently with this diminution in the acquisition of new domestic consumers, the average revenue received per kilowatt-hour sold has shown an accelerated decline. From an average of 6.55 cents in 1928, it has dropped to 6.36 cents for the twelve months ending with July 31. On the basis of the first seven months, the indicated average for the complete year 1929 is thus 6.20 cents per kw-hr.—a decrease of 4.6 per cent below 1928 and comparing with a decrease of 3.7 per cent in 1928 over 1927 and of 2.7 per cent in 1927 over 1926. The net result seems to indicate that, while the kilowatt-hours taken by the average domestic consumer in 1929 will have increased by perhaps 8 per cent, this same consumer's annual bill will only have increased by 2½ per cent. While it points out the continuation of the industry's general policy of more service at lower rates and of its sharing with the consuming public the benefits accruing from improved engineering and management, it emphasizes the widening gap between the gains in kilowatt-hours and the gains in gross revenues.

Electric Light and Power Industry

Growth in Number of Consumers and in Installed Generating Capacity Since the First of the Year, 1929

The data here presented are for the total (100 per cent) electric light and power industry and are based upon the monthly reports received through the cooperation of some 400 companies, representing over 86 per cent of the industry.

Number of Customers

		——Commercial——			
	Domestic Service	Small Lt. & Pwr.	Large Lt. & Pwr.	All Others	Total Customers
December 31, 1928	19,072,000	3,575,000	527,000	29,000	23,204,000
January 31, 1929	19,115,000	3,580,000	532,000	29,000	23,256,000
February 28, 1929	19,162,000	3,569,000	530,000	30,000	23,291,000
March 31, 1929	19,202,000	3,592,000	530,000	30,000	23,354,000
April 30, 1929	19,269,000	3,600,000	536,000	32,000	23,437,000
May 31, 1929	19,345,000	3,616,000	543,000	32,000	23,536,000
June 30, 1929	19,429,000	3,612,000	545,000	32,000	23,618,000
July 31, 1929	19,485,000	3,620,000	545,000	33,000	23,683,000

Kilowatts of Generating Capacity

	Steam Engines and Turbines	Water Wheels	Internal Combustion	Total (Kw.)
December 31, 1928	19,716,000	7,429,000	295,000	27,440,000
January 31, 1929	19,737,000	7,453,000	305,000	27,563,000
March 31, 1929	19,991,000	7,482,000	305,000	27,778,000
April 30, 1929	20,177,000	7,534,000	308,000	28,019,000
May 31, 1929	20,320,000	7,525,000	311,000	28,156,000
June 30, 1929	20,380,000	7,562,000	311,000	28,253,000
July 31, 1929	20,707,000	7,570,000	311,000	28,588,000

ENGINEERING SECTION

Alex. D. Bailey, *Chairman* **H. S. Bennion**, *Director of Engineering, N. E. L. A.*

Report of Special Engineering Research Committee

C. F. Hirshfeld, *Chairman*

In the fall of the year 1928, the Special Engineering Research Committee was added to the list of committees of the Engineering National Section of the N. E. L. A. "for the purpose of studying in the broadest possible way the general situation in the power industry in respect to engineering research."

In the past few years it had become very evident that the volume of research work carried on by the member companies and by various national bodies, technical societies and other organizations would soon become so great and so diversified that the existing N. E. L. A. machinery would prove incapable of deriving from it the maximum of usefulness for the member companies. Very good work was being done by the various committees with respect to research in their own particular lines of activity, but the realization had become general that there existed a considerable duplication of effort which was wasteful of time and money, although entirely unavoidable under the circumstances.

In order to study the situation, to provide a clearing house for information on research and an adequate means of instituting new projects, the Special Engineering Research Committee was formed with its purpose and scope of activity defined as quoted above. The first step of the new committee was to gather together a mass of information concerning the research work of the member companies of the N. E. L. A., that of the Association itself and that of other bodies which appeared to be of interest to N. E. L. A. companies. These data, although very incomplete as yet, have already shown that the fears of the Association officials were not groundless. Considerable duplication of effort is indicated by the reports of member companies and committee chairmen. Just to what extent this duplication exists, is impossible to say at present, as the committee has as yet been unable to get sufficient detailed information in most cases.

Take, for example, the investigations of characteristics and performance of lead covered cable. According to the material at hand at present there are seven separate and distinct investigations of such a nature under way, representing the efforts of nine member companies, two national organizationts and five technical schools. No doubt some of these investigations are being conducted along very dissimilar lines with entirely different objectives. This, in fact, is indicated by the individual reports of some of the companies. On the other hand, there is the possibility of considerable undesirable duplication in the case of certain fundamental investigations which fall within the general scope of cable research.

It is also logical to assume that the results of a certain amount of this fundamental research might be very valuable in investigations of a quite different nature. The knowledge of insulating and heat resisting qualities of various materials is certainly not confined in application to cable research alone, but is equally valuable in the solution of. many other problems in power generation and transmission.

The information on hand has been coordinated and arranged in sections according to the nature of the organization doing the work and is included in the supplement to this report. The information at hand is too meagre to justify any claims for completeness or great accuracy in these listings; they are however informative. It is interesting to note that the member companies are doing a large amount of very important work covering a quite extensive field. In most cases the projects have been brought to completion or are under way at the present time, while some jobs are contemplated for the near future.

More detailed information on the individual projects is available in the files of the committees, but it is not considered necessary or advisable to include it in this report.

Prospectus of Electrical Apparatus Committee Activities for 1929-1930

R. A. Hentz, *Chairman*

The Electrical Apparatus Committee for the past three years has functioned with four major subcommittees, viz., the Generating Stations, Substations, Operating Practice and Utilization Subcommittees, and for a part of that time with a fifth, known as the Fundamental Plans of Systems Subcommittee. This subcommittee, because of the broad scope and importance of the field it covered, has since taken the status of a separate committee of the Engineering National Section known as the Power Systems Engineering Committee.

As a result of the experience obtained with these subcommittees, it appeared to be a logical and desirable step to abandon the Generating Stations and Substations Subcommittees, which necessarily have a number of common problems, and to replace them with three subcommittees whose duties will involve less overlapping of subjects. The three new subcommittees are the following:

Station Design Subcommittee.
Machinery Subcommittee.
Protective Equipment Subcommittee.

The Station Design Subcommittee will consider problems relating to the physical and electrical design of both generating stations and substations; the Machinery Subcommittee will deal with generators, electrical transformation apparatus, both rotating and static, and their associated equipment including switchboards, conductors, insulators, etc., and the Protective Equipment Subcommittee will study problems on relays and relay protective systems, circuit breakers of all types, reactors, resistors, lightning arresters, choke coils, etc.

In addition to these three subcommittees, the Utilization, Operating Practice, Foreign Practice, and the Codes Subcommittee will be continued. The Publications Subcommittee will be discontinued, its functions being absorbed elsewhere.

It is probable that four meetings of the committee will be held during the year, the first taking place in Pittsburgh on Oct. 2 and 3 in conjunction with the first group meeting of the Engineering National Section, and the third in connection with the second group meeting of the National Section. The locations and dates for the other two meetings have not yet been definitely determined.

The committee has a large list of subjects for consideration during the coming year, among the most important of which are the following:

1. Revision of the Relay Handbook.
2. Further studies on neutral grounding.
3. Further standardization of utilization voltages.
4. Motor installation rules.
5. Formulation of motor starting rules consistent with modern practice.
6. Cooperation with the Edison Association in standardization of oil circuit breakers.
7. Standardization of phase angles, positions, and sequences.
8. Lightning arrester test standards.
9. Standardization of terminal lugs.
10. Research on insulating oils.
11. Further standardization of insulating oils.
12. Experience with mercury arc rectifiers.
13. Suggest specifications for rubber insulations.
14. Standardization of lead arrangement for induction regulators.
15. Hydrogen filled rotating apparatus.
16. Apparatus fires and fire protection.
17. Frequency converters.
18. Standardization of markings for multi-conductor control cables.

It is expected that two serial reports will be issued during the year, one on "The Function of the Generating Station in System Control" and the other a revision of serial report No. 24-34, "Electrically Driven Auxiliaries in Steam Generating Stations." Should consideration of the subjects listed above develop the necessity for serial reports, they will be undertaken.

In addition to the publication of serial reports, short articles on specific subjects of immediate interest, as well as general articles summarizing committee discussions at the meetings, will appear in the N. E. L. A. Bulletin.

Joint Subcommittee on Development and Research Releases Four Reports to Member Companies

THE Tenth Semi-annual Meeting of the Joint Subcommittee on Development and Research of the N. E. L. A. and Bell System was held at New York on May 29, 1929. The subcommittee reviewed the work that had been carried on by its eleven project committees during the six months' period since its preceding meeting. The project committees presented reports which showed that considerable progress had been made during this interval.

Of these reports, four were considered to be of sufficient general interest to warrant further distribution. These were transmitted by the Development and Research Subcommittee to the Engineering Subcommittee with the recommendation that they be made available to member companies of the N. E. L. A. and associated companies of the Bell System. The Engineering Subcommittee, acting upon this recommendation, released the reports and instructed the Headquarters Staffs to make them available as recommended. The ground covered by these reports is briefly indicated below.

Protection of Telephone Circuits

Project Committee No. 2, which deals with the protection of telephone circuits, presented a report on tests made at Athenia, N. J. This investigation was undertaken for the purpose of ascertaining the causes of the operation of protectors on an aerial telephone cable which parallels an underground power cable. It was known that disturbances in the telephone circuits were experienced at a time when fault conditions obtained in the power system. A significant conclusion to be drawn from this study is that the phenomena which were at first attributed to a rise in ground potential were found actually to be due to induction. Information is given in the report on the distribution of ground potential around the Athenia Substation, the coefficients of induction between the power and telephone circuits, and the division of return fault current between the power cable sheaths and ground.

Power Circuit Residuals

The report from Project Committee No. 3, on power circuit residuals and methods for their control, covered its investigation of residuals under fault conditions in the 33-kv. network in Dayton, Ohio. Information is given on the distribution of currents and voltages in the interconnected network, together with the effects on currents and voltages at time of fault due to the placing of various amounts of resistance in the grounding connection of the system. Methods of calculation are explained for obtaining the fault current, the distortion of the voltage triangle, and the power available for the operation of directional ground relays for a phase-to-ground fault. These include an expansion of the zero-phase sequence method of calculating short-circuit currents in order to include the effects of load and of line capacitance to ground.

Joint Use

Project Committee No. 6, which is concerned with Joint Use, presented the complete report on its Minneapolis investigation. This supersedes the Progress Report which was prepared and distributed in 1926 in order that the outstanding results of this investigation would be available without awaiting the time necessary for the preparation of the complete report. The report treats in considerable detail the inductive relations between power distribution circuits and telephone subscriber circuits. The data presented make it possible to obtain the changes in influence resulting from modifications in the type of distribution circuit, and also the changes in susceptiveness resulting from modifications in the telephone circuit. The coupling between these classes of circuits and the shielding by the telephone cable sheath is fully treated.

Inductive Susceptiveness of Automatic Train-Control System

Project Committee No. 6 also presented a report giving the results of its study of the inductive susceptiveness of an automatic train-control system. This work, although outside of the scope of the project committee, was carried out in order to establish the limiting conditions for tests on the experimental line in Elmira so that there would be no danger of causing false operation of the train-control system on the paralleling railroad.

These reports are now being printed, and they will be available to interested parties about the middle of November.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of N. E. L. A. Bulletin, published monthly, at New York, N. Y., for October 1, 1929.

State of New York.
County of New York.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Wilgar Coleman, who, having been duly sworn according to law, deposes and says that he is the Editor of the N. E. L. A. Bulletin, and that the following is to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are: Publisher, National Electric Light Association, 420 Lexington Avenue, New York City; Editor, Wilgar Coleman, 420 Lexington Avenue, New York City; Managing Editor, none; Business Manager, none.

2. That the owners are: National Electric Light Association, 420 Lexington Avenue, New York City, Mutual Organization, not incorporated. Membership approximately 22,000. M. S. Sloan, President, New York N. Y.; P. S. Young, Treasurer, Newark, N. J.: Paul S. Clapp, Managing Director, National Electric Light Association, 420 Lexington Avenue, New York City.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

Wilgar Coleman,
Editor.

Sworn to and subscribed before me this 24th day of September, 1929.

(Seal) Jessie S. Riker,
Notary Public, N. Y. County.
(My commission expires March 30, 1931.)

PUBLIC RELATIONS SECTION

Harry Reid, *Chairman* **George F. Oxley**, *Director, Department of Public Information*

Public Relations Section Executive Committee Meeting

PLANS for a National Employees' Speaking Contest, arranged by the Public Speaking Committee, W. S. Vivian, chairman, have met with enthusiastic acceptance throughout the industry, according to reports presented by representatives of all Geographic Divisions attending the meeting of the Public Relations National Section Executive Committee in Chicago, Sept. 24.

Chairman Vivian also reported, stating that his committee had met the previous day with a complete representation from Geographic Divisions. Each division reports work well in hand with committees appointed to conduct the contest and arrange for the individual company contests and state contests for elimination purposes prior to the holding of the Geographic Divisions contests. The final date for the holding of divisional contests has not been set, but will be announced in the near future. All of these contests, of course, must be completed sufficiently in advance of the 53rd Convention of the Association, to be held in San Francisco the week of June 16, to permit of arrangements being made for the holding of the national contest.

Committees Functioning

The Section's Executive Committee meeting was exceptionally well attended and except in one or two instances where conventions were held late in the summer, divisional committee organization has been completed and the committees are functioning on the year's program.

The meeting was presided over by Chairman Harry Reid, who first called upon divisional representatives and Geographic Division presidents for statements regarding activities in their divisions. He then asked Managing Director Paul S. Clapp for a statement of headquarters activities, and subsequently received oral reports from the chairmen of the several committees of the section.

W. H. Hodge, chairman of the Customer Ownership Committee, reported his committee had held a meeting the previous day, with good attendance. He said the committee is making a complete study of the subject of customer ownership. Greater cooperation with the Better Business Bureau was urged as was also the formation of thrift savings clubs among employees.

Industrial Relations

Homer E. Neisz, chairman of the Industrial Relations Committee, called attention to the committee's four serial reports on Contact Training, also to a report by the Medical and Health Subcommittee. Mr. Neisz stated his committee feels that its work this year should center largely on the introduction and perusal of this text material, and it is the purpose of the committee to disseminate the material through the Geographic Divisions. In order to acquaint the Geographic Divisions with the program arranged, a meeting of the committee was scheduled for September 28 and 29 in Chicago. At this meeting will be presented a discussion of the reports in the form of questions, the answers to all of these questions being contained in the reports themselves; also the committee will prepare a method, or several methods, by which these reports can be best utilized. Following this meeting, division conferences will be arranged at which all member companies will be represented. The subcommittee on Medical and Health is preparing a further report, which, it is hoped, will be of such a nature that it can be used as text material for distribution to Geographic Divisions during the following year. A new subcommittee has been formed on Methods of Arranging and Holding Employee Educational Meetings. The subcommittee is actively at work and will prepare and issue a report during the year.

John F. Gilchrist, chairman of the Relations with Educational Institutions Committee, stated that one of the great problems the electric light and power industry has, in common with other great industries in this country, is the question of securing properly trained young men and women, and that he hoped his committee will be able to map out a policy that will accomplish much in this direction.

Women's Committee

Miss Sara Harris, chairman of the Women's Committee, reported that her committee had held a well-attended meeting the previous day. Three subcommittees had been appointed: Home Service, Manufacturers and Safety. She stated that the Home Service Committee has definite plans for promoting home service work within the electrical industry. A manual of "How to Organize and Operate a Home Service Department" will be issued shortly. Also, a service is being inaugurated at headquarters which will give to Home Service Departments, and companies interested in establishing Home Service, information and material of assistance to them. The Manufacturers Women's Subcommittee program for the year will aid in carrying out home service and educational programs of the Women's Committee. The Safety Subcommittee will work with the Accident Prevention Committee and the Home Safety Committee of the National Safety Council. The educational program of the Women's Committee, which will be printed and distributed during October, will embrace the general topics of Economics of Utility Industry, Electricity in the Home, Safety, and Proper Manner of Employee Contact with Customers. Miss Harris stated that women's committees all over the country are cooperating in the National Food Preservation Program and Light's Golden Jubilee, and will take an active part in the National Employees' Speaking Contest.

Miss Eloise Davidson was called upon by Chairman Reid. She urged that more attention be paid to building the "household load."

Chairman Reid announced that Charles B. Stuart of Halsey Stuart & Company, New York, has accepted the chairmanship of the Relations with Financial Institutions Committee and that a program of that committee's work will be available shortly.

Report of Director of Public Information

In the absence of T. A. Kenney, chairman of the Information Bureau Committee, George F. Oxley, director, Department of Public Information, N. E. L. A., reported that a meeting of directors of information bureaus and publicity men of the larger companies is planned for November 11 and 12 in Chicago, and it is the hope of the committee that every director will be present and as many as possible of the public relations men.

Mr. Oxley, reporting on the activities of the Department of Public Information, called attention to three weekly services sent out from headquarters, the Information Letter, Public Opinion, and Electrical News Items, and to the monthly Advertising Copy Service, also to Electrical Research Statis-

(*Continued on page 684*)

COMMERCIAL SECTION

MARSHALL E. SAMPSELL, *Chairman* C. E. GREENWOOD, *Commercial Director, N. E. L. A*

Fifth Annual Commercial School in Nebraska

By THORNE BROWNE

NEBRASKA Section National Electric Light Association, closed its fifth annual school for commercial men Sept. 14 with a registration of 116. It was the most successful school so far held.

The program was so arranged that time was fairly well divided between talks from outstanding nationally known sales experts and round table discussions of the salesmen themselves relating to everyday problems. Every company operating in the state sent considerable delegations. Jobber and manufacturer representatives of this territory also attended.

Outstanding numbers on the program were as follows:

"What is Selling?"
P. L. Miles, Edison Electric Appliance Co., Chicago, Ill.
Discussion by H. G. Kobick, Hurley Machine Co., Chicago.
"Training Salesmen, and Salesmen's Responsibilities."
R. B. Wilson, President, The Premier Co., Cleveland, Ohio.
"Selling Small Appliances."
C. Lammers, General Electric Co., Chicago.
"Rural Merchandising."
K. R. MacKinnon, Nebraska Power Co., Omaha, Neb.
"Selling Better Lighting."
W. H. Rademacher, Edison Lamp Works, Chicago.
"Selling Electric Cookery."
W. A. DannenHauer, Edison Electric Appliance Co., Chicago.
"Publicity."
Marshall Adams, Westinghouse Company, Chicago.
"Public Relations in Selling."
Colonel G. W. Hill, Automatic Washer Co., Newton, Iowa.
"What Electric Refrigeration Will Do."
J. S. Sayre, Kelvinator Corporation, Detroit, Mich.

All these numbers were discussed by sales managers and salesmen following the leading discussion.

This annual instruction school is a camp affair. Sessions are held at a Y. M. C. A. camp remotely located on the banks of the Blue River. Each registrant pays a definite fee upon arrival for which he is entitled to quarters and excellent food. Permanent bunk houses supply sleeping quarters.

The school is run with a good deal of precision. Committees have charge of each portion of the activities and are responsible for their part being done. Every registrant is supposed to attend the sessions. A police committee has the job of seeing that the attendance is complete. Their duties are light, for the sessions are so interesting that approximately 100 per cent attendance is present at each session. School hours are so arranged, however, that some time is offered for recreation and provision is made through committees for opportunity to play.

Stanley Taber, general sales manager, Iowa-Nebraska Light & Power Company, was general chairman of this year's school.

In return for use of the camp the commercial men have undertaken to improve facilities and accommodations, and as a result of several years of effort there is now installed complete sanitary equipment, water pressure system with electric pump, a completely electrified kitchen, and electric water heaters for dish washing and shower baths.

GEOGRAPHIC DIVISIONS and STATE ASSOCIATIONS

Pennsylvania Electric Association Convention

MORE than 900 delegates and guests registered for the twenty-second annual convention of the Pennsylvania Electric Association, held at Bedford Springs, Pa., on September 4, 5 and 6. Notable among those urging increased commercial activities as the most promising and pressing of current opportunities for utility organizations were Mathew S. Sloan, president of the National Electric Light Association; Frank R. Phillips, president of the Pennsylvania Electric Association and senior vice-president of the Philadelphia Company; A. B. Millar, managing director of the Pennsylvania Electric Association, and E. W. Judy, vice-president and general manager of the Duquesne Light Company.

"We have accomplished great things technically," said Mr. Sloan. "We have done great things in making ever-improving service available to more and more people for more and more forms of use. But we still have a long way to go, both in reaching others who could profit by the use of electric service and in effecting a wider use of service by those now on our companies' lines. The test of our industry now, as in the past, is its usefulness to the public. The path of progress for us is clearly outlined. It is to supply better service, to reach more customers with it, to sell it at lower rates and to make it more useful to all our customers."

A reception to President and Mrs. Phillips on Wednesday evening was the only official activity that day. The first general session on Thursday was given over to the presidential address, the reports of various committees and an address by A. B. Millar, managing director of the association. President Phillips particularly emphasized the rapid growth of rural electrification in Pennsylvania, showing that while between 5 and 6 per cent of the nation's farmers received the benefits of electric service, in Pennsylvania 32.5 per cent were served. Present construction work is proceeding in that state at a rate of 4.7 miles per day, an estimated daily gain of 54 rural customers.

Following a review of the year's work, C. H. Frick, Pennsylvania Power & Light Company, chairman, at the engineering session Thursday afternoon, introduced E. C. Stone of the Duquesne Light Company, who emphasized the benefits to be derived from the committee work of electrical associations and who contended that engineering policies should be formulated with public and commission viewpoints in mind in order to promote harmonious relationships.

C. S. Coler of the Westinghouse Electric & Manufacturing Company discussed the recruiting and training of engineers for the power industry, pointing out that the supply of well-qualified men has always been limited and that the full co-operation of manufacturers and utilities is to be encouraged.

In enumerating the various activities to which safety department work is related, Edward C. Spring, director National Safety Council, gave relative preference to operating, construction, employment, purchase of supplies, welfare of employees and public relations. "Every employee should be in complete accord with what safety means to him and his fellow workers or be removed," said Mr. Spring.

A demonstration of the transformation of light energy to sound energy and of the transmission of sound by projected light paths was made by John B. Taylor of the research laboratory of the General Electric Company.

As chairman of the accounting session H. P. Smith of the Duquesne Light Company suggested that the accountant was becoming more and more important in utility work, if for no other reason because of his relation in establishing fundamental facts for action in the increasingly important transition between existing and proposed rate forms. E. A. Davis, general auditor Middle West Utilities Company, paid high tribute to the results for improved economy realized through the uniform classification of accounts.

"What About Public Relations?" was the title of the address by Harry Reid, president of the National Electric Power Company and chairman of the Public Relations National Section of the N.E.L.A. "It has always been my belief," Mr. Reid said, "that good service is the best answer to the demagogue. Here are the two goals of public relations work—to understand and to be understood, to know and to be known, and to be guided and helped by this mutual process."

Henry Swift Ives of the Association of Casualty and Surety Executives spoke on "The Duty of Industry to the Public," and R. N. Blasingame, chairman of the farm machinery division at Pennsylvania State College, reviewed progress in the use of electricity on the farm and its potentialities.

The final session, that of the Commercial Section, was addressed by H. C. Thuerk of the Erie Lighting Company, chairman; A. W. Robertson, chairman of the board of the Westinghouse Electric & Manufacturing Company; Paul Freedley of the Pennsylvania Salt Manufacturing Company, and A. S. Turner of the Edison Lamp Works. Mr. Robertson reminded the audience that the point of view of the customer is non-technical. Mr. Freedley emphasized the influence of obsolescence of generating equipment in private plants and central stations upon the decision of the industrial customers to purchase power, and urged the continued and more intensive study of "border-line" conditions to determine the economics of any given problem. According to Mr. Turner, America pays $45,000,000 a year for light that it never receives, owing to drops in voltage on the customers' premises occasioned by inadequate equipment.

The program included a number of special entertainment features, a session for women, talking "movies" at each session presenting prominent men and their messages, and a first-aid contest.

Officers for the coming year are: President, John F. Ford, Philadelphia Electric Company; vice-presidents, F. B. Hofft of Johnstown and W. H. Horton, Jr., of Pittsburgh.

New England Division Convention

THE twenty-first annual convention of the New England Division of the National Electric Light Association, held Sept. 9-12, at New London, Conn., was most successful from every standpoint.

After Lieutenant-Governor Rogers of Connecticut had welcomed the visitors, President M. S. Sloan of the national body spoke at the opening session upon the economic contributions and opportunities of the industry to the public welfare, stressing the effect of electric service upon mass production, high wages and purchasing power, pointing out the importance of promotional rates and alluding to the need of long-time programs for complete home electrification instead of flash-in-the-pan campaigns.

Charles A. Eaton, member of Congress from New Jersey, voiced the ideals of the industry's service which have strengthened its position as a major factor in the growth of civilization and urged stalwart defense of proven policies in the face of political attacks. Richard T. Higgins, chairman of the Connecticut Public Utilities Commission; John L. Madden, vice-president of the Metropolitan Life Insurance Company; Managing Director Paul S. Clapp, Anna Steese Richardson, Dudley Harmon, executive vice-president New England Council, and Katherine A. Fisher also contributed timely addresses.

President I. W. Day's address stressed the need of a greater effort to increase the per capita use of electric service in New England, which has 10 per cent of the central-station customers of the country with only 6.5 per cent of the electricity generated. He also advocated a simplification of the committee work of the association.

Chief interest perhaps centered in the Commercial Section. In opening its sessions on Tuesday, President Day admitted that inducement rates, appliance sales, window-dressing and other things are essential factors in increasing the sale of electric service, but held them to be useless unless backed up with real sales effort.

D. M. De Bard, chairman of the Merchandising Bureau, dwelt chiefly on the great opportunities left for merchandising, pointing out that 33 per cent can be added to domestic lighting, 70 per cent to home appliances, and about 98 per cent to ranges and water heaters. On conservative estimates the average domestic revenue can be raised to $100 a year. He declared, however, that inducement rates are a prerequisite to increased sales.

Miss Sarah Harding Hunter cited several conditions that are preventing wider acceptance of household conveniences, mentioning the pride with which some thrifty housewives hold down the use of energy. Furthermore, she took utility people to task for not practising what they preach, quoting from the testimony of 150 executives and the same number of employees to show their own limited use of appliances.

W. G. Keay sketched efforts being made to arouse a greater appreciation of the importance of low temperature in preserving food and health.

The principal speaker before the Power Bureau group—John L. Madden—reviewed the findings of the Metropolitan Life Insurance Company on "migration of industry," originally presented at Atlantic City, and went into some details affecting New England. The most significant conclusions which he drew from the national figures are: (1) that the net value of attempting to attract industries into new territories is very small and hardly justified by the expense; (2) little money is spent to help new industries develop once they are obtained; (3) adequate data are not kept on the rate of expansion of existing industries, and (4) little attempt is made to ascertain why industries move away. To serve as a barometer of business, Mr. Madden said, the survey should be made perpetual by some neutral organization like the United States Department of Commerce.

The principal points made by A. W. Milliken, chairman of the Power Bureau, were that utilities should be guided in their sales work by what is best in the long run for their customers and that an opportunity to formulate rates should be given to power salesmen.

The Accounting Section held two large and enthusiastic sessions on Monday, at which much informal discussion took place on merchandising accounting and other moot topics. A women's session on Wednesday morning, one of public relations on the evening of the same day and an engineering session on Thursday morning all proved worth while.

Empire State Convention

REFUTATION of some of the statements recently made by Governor Franklin D. Roosevelt of New York regarding the alleged neglect of the farmers of that State by the electric utilities was included in the address of President C. S. Ruffner at the annual convention of the Empire State Gas and Electric Association, held at Upper Saranac, N.Y., on September 19 and 20. "This branch of our business," said Mr. Ruffner, "which holds such tremendous possibilities in load building, has shown very substantial progress in the last three years. New York State now ranks second only to California in the number of farms served with electricity."

In order to meet the problems involved in further extending service, Mr. Ruffner pointed out the necessity of developing more aggressive sales efforts and of reconstructing and modernizing rate structures. "In this matter of rates," contended the president, "the public has certain rights. It is entitled to rates that it can understand. This means the simplification of rate structures and the elimination of that vast growth of schedules that has evolved either out of constantly changing conditions in the industry or out of an attempt to patch up some purely local situation with a new rate."

Matthew S. Sloan, president of the National Electric Light Association, also addressed the convention on Thursday. Mr. Sloan said: "There lies before us another opportunity for service. As we have been a basic element in revolutionizing conditions in American industry, so we must take equal part in revolutionizing American homes. We of the power and light companies have neither taken full advantage of our opportunities as business men nor done our full duty as agencies of public service."

Other speakers on the first day's program were Dean W. E. Mosher of the School of Citizenship and Public Affairs, Syracuse University; Earl Whitehorne, assistant vice-president McGraw-Hill Publishing Company, and Albert W. Whitney, president National Bureau of Casualty and Surety Underwriters. Dean Mosher viewed the electric utilities as needing a more positive and constructive leadership. As a first step he advocated the establishment of an industry code of ethics for both operating and holding companies. Mr. Whitehorne foresaw the need in the utility business of a closer approach to the attitude of other businesses which advertise and sell, not their factories or gifts to humanity, but their products in terms of the user's interest. Mr. Whitney, whose topic was "Accident Prevention from an Executive Point of View," compared the old ideas of safety to an appliqué affixed after the engineers and architects had done their jobs, while the newer attitude makes safety a production factor.

In discussing the water-power development of New York State at the Friday session, R. J. Le Boeuf, Jr. cited decisions of the courts in past years and analyzed present political and legal elements, concluding that in New York there is little likelihood of State water-power development and that private enterprise should push ahead. Navigation he regarded as a secondary issue, from the standpoint of public welfare, power development being the important thing.

Other speakers on Friday included Senator Seabury C. Mastick, who advocated a State department of commerce; Oscar H. Fogg, president American Gas Association, and Frieda Miller, director Bureau of Women in Industry, who urged better appreciation of the woman's viewpoint as a consumer of manufactured products and as a worker in industry.

Reports of the year's activities were made by the chairmen of the accident prevention, accounting, electric meter, public utility information, public speaking, women's, electric, commercial and gas sections.

Officers elected for the coming year are: President, William J. Welsh, president New York & Richmond Gas Company; first vice-president, John N. Carlisle, president Northern New York Utilities, Watertown; second vice-president, F. W. Smith, vice-president United Electric Light & Power Company, New York; treasurer, H. O. Palmer, vice-president Empire Gas & Electric Company, Geneva.

Rocky Mountain Division and Two State Associations Hold Joint Conventions

SPORT, entertainment and business divided the attention of the delegations to the joint convention of the Rocky Mountain Division of the N. E. L. A., the Colorado Utilities Association and the Wyoming Utilities Association held at Glenwood Springs, Colo., on Sept. 2, 3 and 4.

The first day was devoted entirely to pleasure. On Tuesday and Wednesday the delegates got down to business, W. D. Johnston, president of the N. E. L. A. division, and V. L. Board, president Colorado Utilities Association, presiding jointly.

Following Mr. Johnston's official address were speeches by Managing Director P. S. Clapp and other representatives of the national body. The Light's Golden Jubilee theme pervaded all the proceedings. Mr. Clapp reviewed the progress of the industry and declared that it is on the threshold of developments so momentous that even its leaders can hardly grasp their significance.

C. E. Greenwood, commercial director N. E. L. A., described the national food preservation program and its relation to the electrical industry. Talking motion pictures of Edison and other notable men with messages to deliver to utility builders were presented, a review of the Atlantic City N. E. L. A. convention was given, and an informative meeting for women was held in which wives of the delegates took part.

Other addresses were made by Mr. Board, B. J. Mullaney of Chicago, F. S. Peterson of the Public Service Company of Colorado, who spoke on the utilities' interests in airport development; Howard S. Robertson, who spoke on the changing aspects of mass transportation, and R. W. Lindsay, telephone engineer.

A picnic was held on Tuesday evening, and the annual banquet concluded the program Wednesday night. J. A. Clay, Western Colorado Power Company, was elected president of the Rocky Mountain Division, N. E. L. A.; Ray M. Morris, Mountain States Telephone Company, of the Colorado Utilities Association, and H. L. Williams, Evanston, Wyo., of the Wyoming Utilities Association.

WOMEN'S COMMITTEE

Miss Sara Harris, *Chairman* **Miss Isabell Davie**, *Secretary*

News Letter

By Mrs. Thelma Van Ness
Publicity Chairman

PERSONNEL WOMEN'S COMMITTEE—1929-30

Chairman

Miss Sara Harris, Utica Gas & Electric Co., Utica, N. Y.

Vice-Chairman

Mrs. Ruth E. Creveling, San Diego Consolidated Gas and Electric Co., San Diego, Cal.

Secretary

Miss Isabell Davie, N. E. L. A., New York, N. Y.

Members-at-Large

Miss Marguerite Butler, Portland Electric Power Co., Portland, Ore.
Miss Florence Clauss, Electrical Merchandising, McGraw-Hill Pub. Co., New York, N. Y.
Mrs. Pearl Evans, National Electric Power Co., 57 William Street, New York, N. Y.
Miss Florence Freer, Brooklyn Edison Co., Inc., Brooklyn, N. Y.
Miss Sophia Malicki, Middle West Utilities Co., Chicago, Ill.
Miss Elizabeth Murray, Atlantic City Electric Co., Atlantic City, N. J.
Miss Helen Norris, Commonwealth Edison Co., Chicago, Ill.
Miss Helen Smith, Rochester Gas & Electric Corp., Rochester, N. Y.
Mrs. Florence Tate, Central & South West Utilities Co., Dallas, Tex.
Mrs. Thelma Van Ness, Consumers Power Co., Jackson, Mich.
Miss Mary Walsh, The Washington Water Power Co., Spokane, Wash.
Mrs. Sarai Waugh, Westchester Lighting Co., Mt. Vernon, N. Y.
Miss Clara Zillessen, The Philadelphia Electric Co., Philadelphia, Pa.

Division Representatives:

Canadian
Miss Florence Donkin, The Shawinigan Water & Power Co., Montreal, Canada.

Eastern
Miss Iva B. Sellers, Pennsylvania Electric Co., Johnstown, Pa.

East Central
Mrs. Beulah K. Yewell, Kentucky Utilities Co., Louisville, Ky.

Great Lakes
Miss Edna J. Decker, Illinois Northern Utilities Co., Dixon, Ill.

Middle West
Miss Louise Hathaway, Iowa Railway and Light Corp., Cedar Rapids, Iowa.

New England
Miss Sue Carr, Central Maine Power Co., Augusta, Maine.

North Central
Mrs. Mabel Wilson, Northern States Power Co., Minneapolis, Minn.

Northwest
Mrs. Gertrude McDevitt, Idaho Power Co. Boise, Idaho.

Pacific Coast
Mrs. Nyra G. Letchworth, San Joaquin Light & Power Corp., Fresno, Cal.

Rocky Mountain
Miss Irma Ward, Public Service Company of Colorado, Denver, Colo.

Southeastern
Miss Dorothy Murphy, The Tennessee Electric Power Co., Chattanooga, Tenn.

Southwestern
Miss Julie Pailet, New Orleans Public Service, Inc., New Orleans, La.

Subcommittees:

Home Service
Miss Ada Bessie Swann, Public Service Electric & Gas Co., Newark, N. J.
To develop programs of Home Service activities; to assist in establishing Home Service Departments.

Manufacturers
Miss Frances Weedman, Edison Electric Appliance Co., Inc., Chicago, Ill.
To develop cooperation between women of electric serving companies and of manufacturers of electrical household equipment toward accomplishment of the purposes of the Women's Committee.

Safety
Miss Esther Rockey, The Dayton Power & Light Co., Dayton, Ohio.
To develop programs of Safety and First Aid activities for Women's Committees.

* * *

Mrs. Ruth Estelle Creveling, San Diego, Cal., has been appointed vice-chairman of the National Women's Committee, by Miss Sara Harris, chairman of the committee.

Mrs. Creveling is editor of the *News-Meter,* the company magazine of the San Diego Consolidated Gas & Electric Co. She has been active in Women's Committee work in her company for a number of years and for the last two years has served as a member of the National Women's Committee, representing the Pacific Coast Geographic Division.

Mrs. Ruth Creveling

* * *

The appointment of Mrs. Pearl W. Evans as chairman of the Women's Committee, National Electric Power Company, New York, N. Y., has been announced by Harry Reid, president.

Mrs. Evans is well known to many persons in the electrical industry who will be glad to know she is resuming active connection with Women's Committee work. The National Electric Power Company operates in fourteen States, and Mrs. Evans will spend much of her time visiting the various company Women's Committees.

* * *

Miss Dorothy Murphy, chairman of the Southeastern Division, has announced a contest plan for her division for the year 1929-30. Instead of the usual elimination contests that have been featured in the past, the current contest will run throughout the year, and prizes will be awarded on a point basis. Points will be earned by the women employees through participation in any or all of the following activities:

	Points
1. For each essay or published article written on any subject relative to the business (200 words or more)..	10
2. For the best essay in the company committee during any month ..... (not effective unless there are two or more essays written)—company department heads or officials to be the judges	25
3. For each talk made before the company committee on a subject relating directly or indirectly to the business	10
4. For the best talk in a company contest	25
5. For each playlet written relative to any phase of the business.........	25
6. For each participation in any playlet produced (each actor)	10
7. For mastery of the Prone Pressure Method of Resuscitation .... (to be judged by Safety Director or other person qualified)	15
8. For each suggestion made and adopted by the company	25
9. For attendance at meetings—each meeting	5

The contest dates from Aug. 1, 1929 to March 31, 1930. All women employees of companies which are members of the Southeastern Division, N. E. L. A., shall be eligible with the exception of state chairmen and division chairmen. The normal activities of chairmen, secretary and other officers shall not count for points in contest. The following prizes will be awarded at the 1930 Division Convention: $40 to the woman earning the highest number of points in each state; $60 to the woman earning the highest number of points in the entire division; $50 to the company committee having the highest average number of points per member.

Miss Murphy is secretary to J. Conn Guild, vice-president and general manager of the Tennessee Electric Power Company at Chattanooga.

* * *

Several girls in the Illinois Power & Light Corporation are taking active parts in various women's clubs. Miss Viola Stevens, Centralia, Miss Marguerite Miller and Miss Osceola Thornberry, Mt. Vernon, all hold offices in the Business & Professional Women's Clubs in their cities. Miss Lelamae Wood, also of Mt. Vernon, was recently reelected president of the Junior Women's Club. The Misses Thornberry, Wood and Brydon, Mt. Vernon, assisted in the arrangements for the convention of the Illinois Federation of Business and Professional Women held at Mt. Vernon in May.

* * *

Miss Isabell Marquedant, Consumers Power Company, Jackson, Mich., has been appointed Michigan Chairman of the Women's Committee. Miss Charlotte Howard, Jackson, Mich., has been named company chairman for Consumers Power Company. Miss Howard will have fifteen district chairmen, throughout the properties of this company, reporting to her.

* * *

The Consumers Power Company Women's Committee, Owosso, Mich., appeared before the Corunna Women's Club on the occasion of their Community Day Meeting, presenting the "Pageant of Light." There were seventy-five in the audience.

* * *

Nine Central Illinois Public Service Company girls presented the playlet "Evolution of Lighting" before a group of ninety-five, the McDonough County Federation of Women's Clubs, at Macomb, Ill. At Ashland, Ill., a toaster demonstration was given by the Women's Committee in the office of the Central Illinois Public Service Company.

* * *

The August number of *Hi-Voltage,* the magazine of the Empire State Electric Company at Joplin, Mo., was edited by the Women's Committee, under the editorial direction of Misses Nelia Whitford and Cleo Woodworth. This is a sixteen-page publication, filled with interesting news items of interest to company employees. One article tells of a $100 prize won by Miss Helen Tippit in the annual Window Trimming Contest of the Hoover Company, and there is a story about Mrs. W. Lloyd Howard who recently stepped into her husband's shoes and made a wonderful record holding down his job during his illness. Mr. Howard is a securities representative of the Henry L. Doherty and Company Securities Department at Aurora, Mo., and when he was compelled to take a complete rest, Mrs. Howard appeared on the scene and took care of his business splendidly. In fact, she won a fishing trip for Mr. Howard which he had a standing chance to win at the time he became ill.

* * *

In the July issue of *Cipsco News,* Central Illinois Public Service Company, there is an article in the Home Service Department, Miss Gertrude O'Brien, associate editor, about a company school held at Mattoon for a period of three days in July to further acquaint and instruct the women employees with the major appliances sold by the company. The school was planned for range demonstrators, personal service representatives, saleswomen and other women interested in appliances. The chief emphasis of this school was placed on electric cookery and electric refrigeration. Mrs. Margaret H. Craig, Home Economics Consultant of the Middle West Utilities Company, conducted demonstrations on the electric range and special instructions on electric refrigeration were given by Miss Mary Kirk of the Kelvinator Company.

* * *

A member of the Women's Committee of the Portland Electric Power Company, Portland, Ore., Mrs. Grace Parke, last winter won the second prize in that division in the National Lamp Sales Contest. This season she has won all sorts of honors in the National Thor Ironer Contest conducted by the Hurley Machine Company of Chicago. This contest was from June 3 to 29, all sales to be made between those dates. The results were figured each week for four weeks. Miss Grace Parke was in Group 4, competing with men and women selling Thor ironers in all cities in the United States of over 100,000 population. She won second prize the first week, and first prize the second and fourth weeks and in addition, a check for $100 because she was the first woman in any group in the country making 2000 points in the contest. At the end she was declared the national winner and received a wrist watch, the grand prize given by Mr. Hurley.

* * *

The Women's Committee First Aid Team of the Portland Electric Power Company, Portland, Ore., gave a first aid demonstration, splinting and bandaging, under the direction of the Safety Engineer, at the meeting of the Lions Club of Portland, at the Multnomah Hotel, July 26. Musical numbers were furnished by two other women's committee members.

At the July meeting of the Missouri Gas and Electric Service Company, Norborne, Mo., Women's Committee, the girls had as guests the officers of several women's organizations of the city. Miss Verna Kull, chairman, presided and introduced several speakers among the girls themselves who talked on different phases of utility service. After the meeting refreshments were served.

* * *

A report by Miss Lillian Swanson, Northwestern Public Service Company, Huron, S. D., given at the last convention of the North Central Electric Association, should be a real inspiration to the many small groups throughout the country. Miss Swanson said:

> "We are somewhat handicapped by the small number of girls employed in our offices, and due to the fact that our towns are so widely separated it is not practical for several small groups to combine and function as one committee. Many of our offices employ only two girls. Some of the girls have been working in conjunction with the regular company employee meetings.
>
> "Committees have been organized and definite programs are being carried out in each of our four largest divisions, Aberdeen, Mitchell, North Platte and Huron. We have four girls in the Aberdeen office and by inviting in officials, salesmen or heads of departments they have been able to present well-rounded programs. The Mitchell girls, four in number, have solved their problem by inviting the wives of employees to their meetings so that they now have about eighteen members. The wives hold office, prepare talks and take part in the entertainment features.
>
> "There are only four in the group at North Platte but they are all interested in the work and have built up an enthusiastic committee. The Prime Movers, as they call themselves, recently entertained the Business & Profssional Club with a trip through the Northwestern Public Service Company plants, presented an informal program and served light refreshments."

* * *

A report from Miss Mae D. Brooker, Interstate Power Company, Lancaster, Wis., tells of a unique meeting held by the Dubuque, Iowa, group at Union Park, an amusement park owned by the company. Dinner was served to about fifty girls at a long banquet table on the refreshment pavilion. Following the dinner, the safety playlet "Never Say Die" was put on in which three of the girls demonstrated the Prone Pressure Method of Resuscitation. The life guards at the swimming pool gave demonstrations on how to rescue a drowning person. The five girls in the Wisconsin group were guests at this meeting.

* * *

Did-U-No-It is the title of the very interesting and comprehensive bulletin issued by the Women's Committee of the Public Service Company of New Hampshire, Miss Grace A. Phillips, editor-in-chief. The May-June number is a veritable magazine of some thirty pages, all filled with choice articles of interest to the Women's Committee. There is a story about a bridge party conducted by the Manchester, N. H., Business & Professional Women's Club held recently in the demonstration room of the Public Service Company. Just before the card playing, Mrs. Mildred Rees of the Edison Electric Appliance Company, stepped on the stage, which was set with an electric refrigerator, electric range and table, and displayed a dinner ready to be placed in the oven. She explained the operation of the range, placed the dinner in the oven and announced that dinner would be cooked while the card game took place, and at the close of the evening, would be awarded to the holder of the lucky number. Mrs. Josephine H. Pierce of the Eastern Service Refrigerator Company also gave a brief talk on electric refrigeration making particular mention of fancy desserts and ices that could be made in an electric refrigerator. Refreshments consisted of angel food cake baked in the electric oven and ice cream frozen in the electric refrigerator.

* * *

The News-Meter, San Diego Consolidated Gas and Electric Company, San Diego, Cal., in its July issue, contains a report of the Women's Committee meeting at the Pacific Coast Electric Association Convention. Mrs. Anna Steese Richardson, director of the Good Citizenship Bureau of the Woman's Home Companion, was a speaker. At the special Women's Committee session, there were delegates from every committee except Honolulu.

* * *

The July issue of *Snap-Shots,* Georgia Power Company, Atlanta, carries a story of the Women's Committee inspection trip in July. Headed by Miss Ruth Morris, chairman, a large group of women employees made the trip over several of the main Atlanta properties by motor coach. The sightseers visited Spring Street sub-station, Fulton County plant and Boulevard sub-station. At the Spring Street unit, they were shown how that automatic switching and transforming plant operates to serve a large part of Atlanta's residential section. At the Fulton County plant, they viewed the various repair and construction activities which are carried on there, seeing how street cars are repaired, etc. Boulevard sub-station, largest on the company system, also proved interesting as committee "tourists" looked over its huge switches and transformers.

* * *

Mrs. Gloria Rimbach, commercial artist in the Sales Department, Northern Indiana Public Service Company, at Hammond, has been appointed as official interpreter of the International Association of Identification, a world-wide crime prevention organization. The office of interpreter has just been created and Mrs. Rimbach is the first to hold it. She was appointed by James R. Wilkinson, of the Windsor, Ontario, Police Department, president of the international group. She is well fitted for the position since she speaks both German and French fluently and can read and write both languages. Her work will include, in addition to interpreting, correspondence to foreign identification officials and translation of letters from them. According to the present plans of the association, the 1930 international convention will be held at Montreal, Canada, where Mrs. Rimbach will have her first opportunity to act in her official capacity as verbal translator.

MAGAZINE ARTICLES

Below is a list of articles which appeared in various magazines recently that are especially interesting to Women's Committee members:

Delineator—October
- What's New in Floors and Their Care—Grace L. Pennock

Good Housekeeping—October
- Reviewing the Care of Floors—Helen Whitson Kendall
- Coffee, Clear, Sparkling, Fragrant—B. Lawson Miller

Woman's Home Companion—October
- Lamps and Lighting—Hope Harvey
- Good Citizenship East and West—Anna Steese Richardson

Ladies' Home Journal—October
- New Values in Homemaking—Lita Bane

Your Home—October
- Lamps and Shades — Helen Sprackling

Better Homes and Gardens—October
- Autumn Suggests Hostess Aids—Mabel J. Stegner

Woman's World—October
- The Bright New Monday Modern Laundry Methods—Jane Eden
- New Kitchen Conveniences

The Household Magazine—October
- Those Who Wash Must Iron—Harriet W. Allard

McCall's Magazine—October
- How to Take Care of Upholstered Furniture—R. R. Rau

RELATED and other ORGANIZATIONS

Illuminating Engineering Society Convention

MORE than 625 members and guests of the Illuminating Engineering Society registered for the twenty-third annual convention of that organization, held in Philadelphia, Sept. 24-27, the largest number that has ever attended a meeting of that society.

An innovation in this year's program was a pre-convention session for central-station lighting service engineers. At this session it was brought out that electric utility commercial men need not feel that undue concentration will be devoted to building up domestic business to the exclusion of other sales activities, because the illuminating engineers are on record to see that the lighting of great buildings, shops, factories and highways is not only kept up with the best practices of the day, but that such structures are adequately wired to meet the mandates of the future.

A symposium based upon a questionnaire submitted to seven utility companies gave an indication of probable costs to increase domestic sales. Several organizations figured that 10 to 20 per cent of an estimated increase in revenue might be justifiably expended to obtain that increase.

In speaking of general promotional lighting activities, A. A. Brainerd, Philadelphia Electric Company, said, "Since the central station receives the greatest benefit from high-quality lighting, it must be expected to bear the lion's share of the expense. I believe that the logical plan for the most efficient lighting service would be to have all interests involved pool their lighting specification work through the local electrical league in such a manner that the central station lighting service department will do the major part of the engineering work." Mr. Brainerd also suggested that "in the future we should place more effort on selling lighting as a complete system in the sense that ventilating and heating is a complete system.—"We need," he said, "lighting systems instead of installations, foot-candles instead of watts."

(Continued on page 685)

WHAT OCCURRED LAST MONTH

Agricultural

A survey by the Missouri Association of Public Utilities shows that 10,285 farms in Missouri now use electric service. This is an increase of 169 per cent in the last three years.

* * *

Colorado River Project

Two hundred thousand peak horsepower will be added to the output of Boulder Dam should the government follow the recommendations of a resolution adopted recently by the Los Angeles Department of Power and Water. The resolution asks that the height of the dam be raised from 550 ft. to 575 ft., giving as reasons: (1) Better flood control; (2) more complete regulation of the Colorado River; (3) large increase in power at a lower rate.

* * *

Governors of the seven Colorado Basin States held a conference at Salt Lake City on August 28-29, the principal subjects of which were the question of prices for Boulder Dam power and the granting of permits for power development on the river. The conference went on record as favoring "a fair price for power after all factors entering into the proposition of a basis for fixing a price are given due consideration," with special consideration given "to costs and charges for power in the competitive field." The conference favored continuation of the present embargo on power-permits on the river.

* * *

On Sept. 5 the International Water Commission, which has been meeting in Mexico City discussing disposition of the waters of the Rio Grande, Colorado and Tia Juana Rivers, announced that it would be unable to complete its work in Mexico City and would recess on Oct. 10, to reconvene in Washington, probably on Oct. 15.

* * *

Notices have been sent to prospective purchasers of power to be generated at Boulder Dam that their applications for such power must be filed with the Department of the Interior in Washington not later than October 1. Acting Commissioner of the Reclamation Service Dent explains that an allocation method will be adopted to apportion the power among the applicants. He declares, however, that states and cities have preferential rights of purchase.

* * *

The Metropolitan Water District Board of Directors of Southern California has chosen three engineers to select a route for the proposed Colorado aqueduct which is to carry water from the Colorado River.

* * *

On September 23, Secretary of the Interior Wilbur stated that the Reclamation Bureau had been instructed to study plans of Boulder Dam, with a view to building the dam twenty-five feet higher than was first planned. Commissioner Mead of the Reclamation Service expressed the view that the proposal is feasible and practical. He said that for each additional foot in height there would be made available a minimum increase of 150,000 acre-feet of storage space and a decided gain in power-capacity.

* * *

A Washington dispatch quotes Senator Pittman of Nevada as saying that Congress will be asked to grant a special immediate appropriation of between two and three million dollars to carry out preliminary work in the construction of Boulder Dam.

* * *

Consolidations, Etc.

An Insull subsidiary, the Midland Utilities Investment Company, has acquired control of the General Utilities Company, which supplies electric service to twelve communities in southern Indiana, and owns about 85 miles of transmission and distribution lines interconnected with the Interstate Public Service system.

* * *

The Columbia Gas and Electric Corporation has acquired control of the Cincinnati, Newport and Covington Light and Traction Company, an allied organization.

* * *

A certificate filed in the office of the Secretary of State of New York states that the International Power and Transmission Company, Lockport, has been merged with the Lockport Light, Heat and Power Company, by which it had been controlled.

* * *

A conditional offer for the common stock of the Columbus (Ga.) Electric & Power Company made by the Commonwealth & Southern Corporation has been accepted by the stockholders, and the Columbus company is now a subsidiary of that holding organization and allied with the Georgia Power Company and other constituent concerns of the Southeastern Power and Light.

* * *

The Elmira Water, Light and Railroad Company has petitioned the New York Public Service Commission for permission to transfer its franchises and electric and gas plants to the New York State Electric Corporation.

* * *

The American Commonwealths Power Corporation has acquired nearly all the outstanding common stock of the National Gas and Electric Corporation, a system with properties in Michigan, Ohio, Wisconsin, North and South Carolina, Colorado and Alabama.

* * *

The Harpers Ferry Paper Company announces that it has sold to the Insull interests its water-rights in Potomac and Shenandoah Rivers.

* * *

A statement issued by Senator Capper advocates legislation permitting consolidations and mergers only when good cause for such combinations can be shown. The statement declares that mergers should not be permitted unless it is shown that the public as well as the corporations will be benefited.

* * *

On September 9, Matthew S. Sloan, President of the N.E.L.A. and of the New York Edison and associated companies, in an address at New London, Conn., to the New England Division of the N.E.L.A., declared that mergers of operating companies and extension of holding company participation in utility development make for lower costs and greater efficiency and asserted that the advantages obtained by the utilities from these developments should be split with the customer in lowered rates.

* * *

The W. B. Foshay Company has acquired controlling interest in the Dixie Power Company, which serves eighteen communities in Washington and Iron Counties, Utah.

* * *

New York papers of September 25 say that the Public Utility Holding Corporation (recently organized by the Harris, Forbes banking interests and associates) has entered into an agreement with the E. W. Clark interests for the purchase of the Portland (Ore.) Electric Power Company.

* * *

Earnings of Utilities

Figures reported to the Department of Commerce from ninety-five public utility systems or companies, exclusive of telephone and telegraph corporations, representing all the important organization in the United States, show net earnings of $71,000,000 for July, as compared with $62,260,333 for July, 1928. Gross earnings for July were $178,000,000, as compared with $183,000,000 in June and $173,645,919 in July, 1928.

Federal Trade Commission's Investigation

On September 9 Senator Norris introduced a resolution to provide for the printing of all exhibits placed in the record of the Federal Trade Commission in connection with its utilities investigation, except copyrighted books, bulky volumes and other lengthy exhibits, of which descriptions and extracts would be printed.

* * *

The Electric Bond and Share Company and the Federal Trade Commission have asked Federal Judge Knox to appoint a special master to take evidence in the Bond and Share Case, this being in accord with the decision of the case rendered by Judge Knox some time ago.

* * *

Foreign

The $100,000,000 hydro-electric power propject on the Dnieper River, Russia, which is being constructed under the supervision of Colonel Hugh L. Cooper, is reported as half finished.

* * *

A dispatch from Berne, Switzerland, says that a water-power plant which will be completed in four years and will produce more than a third of a million horsepower is well under way near the Jungfrau. A dam 371 feet high, the highest in Europe, is being constructed. A series of falls aggregating 4,000 feet will be part of the project.

* * *

A New York *Times* dispatch from London says that the British Government has appointed a committee to report on the possibilities of a scheme to electrify the whole trunk railway system of Great Britain as an aid in relieving unemployment.

* * *

New York papers tell of the arrival of the Earl of Birkenhead and several associate financiers and business men who have come to the United States to study the operation and management of American public utilities with the purpose of getting information to help solve the problems of the electric power industry in Great Britain.

* * *

Hydro-Electric

Lieutenant-Colonel M. C. Tyler of the Army Engineer Corps has been appointed chief engineer of the Federal Power Commission.

* * *

The Federal Power Commission on October 28 will hold a public hearing on the proposed Flathead hydro-electric project in Montana.

* * *

A dispatch from Richmond, Va., says that the Garden Clubs of Virginia have announced that they are taking an appeal to the Virginia Supreme Court of Appeals from the decision of the State Corporation Commission that it has no jurisdiction in the matter of the proposed hydro-electric development of the North River at Goshen Pass. The Garden Clubs has protested the development, claiming it would be an injury to the scenic beauty of the region.

* * *

On September 4 the Gatineau Power Company commenced delivery of an additional 50,000 horsepower of electric energy to the Hydro-Electric Power Commission of Ontario. This quantity, scheduled for delivery on October 1, increased to 130,000 horsepower the energy now being delivered by the Gatineau Power Company to the commission.

* * *

The President of the California State Senate and the Speaker of the Assembly have appointed a Legislative Committee on Water Problems which will continue the work of a previous committee and will cooperate with the Joint Commission to be named by President Hoover and Governor Young for investigation of California's water-resources.

* * *

Authorities of British Columbia have granted approval to the British Columbia Power Corporation to proceed with its Campbell River power-project.

* * *

Colonel Thad H. Brown of Columbus, Ohio, has been appointed chief counsel of the Federal Power Commission.

* * *

The Holston River Power Company has filed with the Tennessee Railroad and Utilities Commission notice that preliminary work on the three dams to be constructed on the Holston River will be started immediately, this being preparatory to requesting the Federal Power Commission for a permanent license for the projects.

* * *

On September 22 Charles Reid of the Flood-Control Committee of the House of Representatives proposed a national conference on flood-control and waterway development which would attempt to secure united action by the Federal Government, the states and local interests.

* * *

In testifying in a suit at Macon, Ga., September 24, A. R. Graustein, president of the International Paper and Power Company, stated that the company had in mind a project on the Hudson River which would develop annually 500,000,000 or 600,000,000 kilowatt-hours of electricity.

Power Company Sells Newspaper Interests

On September 21 announcement was made by the management of the *Boston Herald* and *Traveler* that the International Paper and Power Company had agreed to sell all its stock in those papers to a group of bankers acting with the management of the papers. A public offering of the stock has since been made by the banking interests.

* * *

Maine

On September 9 voters of Maine, in a referendum ordered by the last Legislature, defeated the Smith-Carlton bill, which would have permitted export of surplus hydro-electric current and would have imposed a tax of 4 per cent on gross receipts from such export.

* * *

Municipal Plants

Grafton, N. Dak., has voted $77,000 for a new municipal electric plant.

* * *

The City Solicitor of Holyoke, Mass., in a report to the Mayor of Holyoke and officials of the Municipal Gas and Electric Department, declares that the plants of the department should be assessed and taxed as is private property, and that a reasonable rental should be paid for use of the department's quarters in the City Hall. He further says that some provision should be made to compensate the city for services rendered the department by officials paid by the city.

* * *

Muscle Shoals

Dispatches from Washington state that Senator Norris will make renewed efforts to secure passage of his new Muscle Shoals bill, which is substantially the same as that which was defeated by President Coolidge's pocket veto. The only important difference between the bills is that the new one provides that Alabama and Tennessee shall have a share of the gross receipts from the sale of power to recompense them for the loss of taxes which would be levied if Muscle Shoals were privately-owned.

* * *

A resolution adopted at the annual convention of the National Association of Power Engineers at Chattanooga, Tenn., September 18, urges that Muscle Shoals be developed under the supervision and ownership of the Federal Government.

* * *

On September 25 the Tennessee Electric Power Company announced plans for the construction of a transmission line to supply industrial and domestic consumers of Nashville with electric current from the Muscle Shoals plants.

New York State

On September 13 announcement was made of the acquisition by the Niagara-Hudson Power Corporation of the Frontier Corporation and of the St. Lawrence Securities Company. The Frontier Corporation owns property along the shore on the American and Canadian sides at the Long Sault Rapids, where it is possible to develop 2,400,000 horsepower, and the St. Lawrence Securities Company owns utility properties in northern New York. Announcement of the purchases brought statements from Governor Roosevelt, Senators Walsh, Capper, Wagner and Norris, and later statements from Thomas W. Lamont of J. P. Morgan & Company and Floyd L. Carlisle and Roy P. Stevens of the Niagara-Hudson Power Corporation.

* * *

Governor Roosevelt declares that the legal status of the St. Lawrence power question is not changed, and reiterates the Governor's views favoring state development of St. Lawrence power. Senator Walsh expresses fear that the purchase may hinder development of the St. Lawrence as a waterway. Senator Norris speaks to somewhat the same effect. Senator Capper believes that New York power interests may work against the waterway project from Chicago to the Gulf of Mexico. Senator Wagner points out that the situation with respect to the St. Lawrence development has not been changed by the purchase.

* * *

The statements by Mr. Lamont and Messrs. Carlisle and Stevens indicate the readiness of the Niagara-Hudson Corporation to cooperate with the state and Federal governments in development of the St. Lawrence and in distribution of power in a manner for the best interests of the people. They state that the company has taken no stand on the question of public or private development of St. Lawrence power and bring out that a proper power development will not interfere with a St. Lawrence seaway project.

* * *

Production of Electricity

According to the United States Geological Survey, the total amount of electric current produced by public utility power plants producing 10,000 kilowatt-hours or more per month was 8,011,000,000 kilowatt-hours in July. This compares with 7,768,000,000 in June and 7,142,000,000 in July, 1928.

* * *

The Department of Commerce on September 25 announced that, according to data collected at the quinquennial census of electric industries and the biennial census of manufacturers taken in 1928, the total output of electric current in the United States (not including outlying possessions) in 1927 amounted to 102,759,753,811 kilowatt-hours. Of this total, 74,686,378,010, or 72.7 per cent, came from central electric stations; 20,558,426,000, or 20 per cent, from manufacturing establishments; 2,975,863,293, or 2.9 per cent, from electric railways; 844,780,315, or .8 per cent, from electrified divisions of steam railways; and 3,694,306,193, of 3.6 per cent, from "isolated" plants. The leading producing states, in order of production, were New York, Pennsylvania, Illinois, California, Ohio and Michigan.

* * *

Public Lands

Drastic changes in the relations between the Federal and state governments in respect to public lands and reclamation service were suggested by President Hoover in a letter to Joseph M. Dixon, Assistant Secretary of the Interior, made public at a meeting of the governors of the public land states in Salt Lake City, August 26. President Hoover's idea is to bring about a greater measure of control by the state governments themselves. President Hoover wrote in part: "Generally, I may state that it is my desire to work out more constructive policies for conservatism in our grazing lands, our water storage and our mineral resources, at the same time check the growth of Federal bureaucracy, reduce Federal interference in affairs of essentially local interest and thereby increase the opportunity of the states to govern themselves and in all obtain better government."

* * *

Railway Electrification

Thirty-five electric switch engines have been bought by the New York Central for use on the west side in New York City.

* * *

Dispatches from Detroit tell of definite plans for the electrification of the Grand Trunk lines between Detroit and Pontiac, Mich., and the construction over the electrified railway lines of a motor speedway.

* * *

Rates

A new schedule of rates for Niagara Falls, filed for approval with the New York Public Service Commission by the Niagara Electric Service Corporation, provides a reduction in excess of 10 per cent to take effect September 4. The new schedule, which the company estimates will bring a saving of $110,000 a year to its customers, on the basis of present consumption, substitutes the present Buffalo power rates for those now charged in Niagara Falls.

Authority has been given by the Board of Railroad Commissioners of North Dakota to the Otter Tail Power Company to standardize its electric rates throughout the state. The company has filed one series of schedules applicable in cities of 2,500 or more population, another series applicable in towns of from 800 to 2,500, and a third series in towns of 800 or less. Eleven different schedules are contained in each series, consumers being given an option as to which schedule they prefer.

* * *

The Kansas City (Mo.) Power and Light Company has filed a voluntary reduction of its residential and commercial lighting rates which will save approximately $360,000 per annum to customers in Kansas City and vicinity.

* * *

The Hartford (Conn.) Electric Light Company has announced that customers will be rebated 60 per cent of their October bills, employees will receive as extra compensation 60 per cent of their October wages, and stockholders as of October 20 will get, as an extra dividend, 60 per cent of their October dividend accrual. The total extra payments thus provided will be about $536,000, of which $350,000 goes to consumers.

* * *

Mayors and other city officials of Georgia have formed the Municipal Utilities Rate Association with the announced purpose of protecting "the interests of gas and electric consumers."

* * *

The Public Utilities Vermont Corporation has filed a schedule reducing rates for residential and commercial lighting in the Richford district.

* * *

The Nebraska Light and Power Company has announced reduced rates for McCook, Neb.

* * *

The Winsted (Conn.) Gas Company has announced a new schedule of electric rates which are particularly advantageous to large domestic users, who are expected to save approximately 40 per cent on household bills.

* * *

The City Council of Wilmington, N. C., has filed with the North Carolina Corporation Commission a petition asking lower gas and electric rates for Wilmington.

* * *

The Fort Dodge (Iowa) Gas and Electric Company announces reductions in rates which will save $27,000 annually to consumers. This is the second reduction announced by the company this year.

The Public Service Commission of Maryland has fixed at $115,000. instead of $137,500, the gross reduction in the rates of the Eastern Shore Gas and Electric Company.

* * *

The Southern California Edison Company has announced a voluntary reduction in rates for lighting which will save consumers about $1,400,000 a year.

* * *

The Brockton (Mass.) Edison Company has announced a reduction in rates for consumers using more than 150 kilowatt-hours.

* * *

The New Mexico Public Utilities Corporation announces reduced rates for Gallup, N. M.

* * *

Regulations, Etc.

Alleging that if the decision of the Nebraska Supreme Court is allowed to stand it will result in establishing a monopoly at Hartington, the Interstate Power Co. has asked that tribunal for a rehearing in the case where it was permanently enjoined from putting in a 6-cent rate in competition with a plant built by another company under a contract to turn the plant over to the city when cost and interest were repaid out of future net earnings.

* * *

The California Railroad Commission has forbidden the Coast Counties Gas and Electric Company to refinance its properties, on the ground that the reproduction cost new might exceed the original cost, which the commission has previously permitted to be capitalized through the issue of stocks and bonds.

* * *

The National Association of Railroad and Utility Commissioners, in annual convention at Glacier National Park, Montana, went on record as opposed to creation of any new Federal agencies interfering with the regulatory powers of the states in fields where the states now practice regulation. The resolution on this subject expressed opposition to the Couzens bill.

* * *

On September 4 Secretary of War Good declared that a study of the water-power problem, such as contemplated in the Couzens bill, should be undertaken. He expressed approval of the provision in the bill which would reorganize the Federal Power Commission by eliminating the Secretaries of War, Interior and Agriculture as members and constituting an independent body of five members.

* * *

Speaking at the New York State Fair at Syracuse on August 29, Governor Roosevelt attacked the inequalities and lack of standardization of telephone and electric rates in New York State, with particular application to rates for rural service. He advocated more uniform rates. He also expressed the view that the question of whether savings promised by mergers have been translated into better service, cheaper and more uniform installation costs, lower rates and simplification of contracts should be investigated.

* * *

A private conference of the six New England Governors and members of the New England Council held at Springfield, Mass., on September 17, discussed water power control and the interstate transmission of power.

* * *

St. Lawrence Project

A dispatch from Montreal says that construction work has been started on the power-project of the Beauharnois Light, Heat and Power Company on the St. Lawrence River.

* * *

In an address to the delegates to the Atlantic Deeper Waterways Association, held at Poughkeepsie September 18, Representative Hamilton Fish declared the St. Lawrence project impracticable, and characterized the all-American route by way of the Hudson as feasible and practical.

* * *

On September 20 Secretary of War Good, addressing the Atlantic Deeper Waterways Association in session at Albany, advocated complete development of the nations inland and coastal waterways, including the St. Lawrence project. The association itself adopted a resolution favoring a waterway between the Great Lakes and the Hudson River of sufficient dimensions to accommodate through shipping between the lakes and the seaboard without breaking bulk.

* * *

At its annual meeting at Duluth. Minn., the Great Lakes Harbor Association pledged itself to a renewal of its effort for construction of the St. Lawrence waterway, and also for maintenance of the water-levels of the Great Lakes.

* * *

Taxation of Utilities

The bill which requires that public utilities other than railways be subject to the income tax and that property taxes of electric, gas and water companies extending into two or more assessment districts be at the state rate instead of the local rate has been signed by Governor Kohler of Wisconsin.

SURGES AND FLASH OVERS

By Fred W. Herbert

Director, Service Department, NELA

There are no free scholarships in the school of experience.

* * *

You can buy a dog with money but it takes love to put a wag in his tail.

* * *

Selling short does not necessarily mean you are in the skirt business.

* * *

In all that people can individually do as well for themselves, government ought not to interfere—Abraham Lincoln.

* * *

A summer resort hotel advertised that they kept an excellent table. The tourists are still trying to find out where they kept it.

* * *

Girls get on the scales nowadays expecting to experience a sinking feeling.

* * *

"I am never so happy as when my husband is down and out," said the aviator's wife.

* * *

It is perfectly proper to speak of the silvery moon. It is made up of halves and quarters.

* * *

The youth's moustache was the inspiration of the installment plan —"A little down then a little more each week."

* * *

The "black sheep" of the family gets sheared first and the "rolling stone" rolls home when his roll is all gone.

* * *

Many a man who seems rough is often a pretty smooth proposition.

* * *

When you "buy anything for a song," does it mean you gave notes on it?

* * *

Initiative is that quality which leads a man to do things when they should be done without being told.

* * *

A new suburban traffic sign:
"If you drive slowly you will see our village. It is very pretty."
"If you drive too fast you will see our prison. It is very dark and damp."

* * *

Two is company and three's a crowd until the fourth comes along for a game of bridge.

* * *

Woman's love for dry goods and man's love for wet goods has ruined many happy homes.

* * *

A son can get an A.B. and an M.A. degree in college but it's his PA that usually supports him.

* * *

Shakespeare said that "All the world's a stage." Many of us are only scenery.

* * *

Answer to the question whether pants is singular or plural: When men wear pants it's plural; when they don't it's singular.

LEGAL DECISIONS from RATE RESEARCH

EDITOR'S NOTE: *Rate Research,* which is published weekly by the Rate Research Committee of the National Electric Light Association, sets forth those decisions of various courts and Public Service Commissions which are of immediate interest to the light and power industry. It does not attempt to publish all such decisions. Decisions not directly connected with the industry are often published if, in the opinion of the editors, the principles involved are of importance.

It is believed that the publication, from month to month, of comments upon some of the leading cases, free from legal phraseology, will be useful. Public utility law is comparatively new, and everyone connected with public service enterprises should have an understanding of the trend and significance of these commission and court decisions.

For these reasons, the N.E.L.A. BULLETIN will carry each month, brief comments on some of the leading cases reported by *Rate Research* as coming before either State or Federal courts or Public Service Commissions.

A Business, As Such, Cannot Be Made a Public Utility by Process of Law

The United States District Court for the Western District of Oklahoma has recently set aside the statutes of Oklahoma declaring cotton gins to be public utilties and subject to regulation by the Oklahoma Public Utility Commission. This means that legislation cannot declare a business a public utility when it is not such in fact and is in accordance with the principles of constitutional law as laid down by the Supreme Court of the United States.

Utilities Cannot Be Compelled to Give Service to Competitors

The Supreme Court of Missouri has recently held that it is neither just nor reasonable to compel a utility to furnish service to be used in competition with its own business. In the specific case before the court a customer of a water company demanded additional service, his purpose being to supply other consumers with water which they could secure directly from the water company.

Exporting Electric Current

Very few States have laws similar to that of the State of Maine designed to prohibit the export of electricity, there being almost universal recognition of the mutual benefits to both the exporting and importing States.

Recently the Public Service Commission of the State of New Hampshire received a request from the Grafton Power Company for permission to export electricity, which was granted upon the following conditions: The exporting company must furnish service within the State at reasonable rates and upon terms as favorable as those granted to consumers outside the State, having due regard to all conditions surrounding the furnishing of service; if, in the future, the electricity which was being exported should be required within the State, the Commission would have the power to so order; and, the Commission is to retain jurisdiction over contracts made and to be made.

At the hearings it was shown that the developed power was more than is needed in New Hampshire at present, and that the request, if granted, would result in an interconnection with a large transmission system capable of rendering additional or emergency service in New Hampshire in case of need.

Effect of the O'Fallon Decision in Indiana

The Indiana Public Service Commission has recently set aside an order (issued some years ago) to the effect that it would base its valuations of interurban, motor bus and street railway properties only upon original or "historical" cost and now holds that in order to arrive at a "legal" valuation it is necessary to consider all pertinent evidence as to the cost of reproduction and the cost of reproduction depreciated.

This decision recognizes the so-called "O'Fallon Decision," in which the United States Supreme Court annulled an order of the Interstate Commerce Commission in the case of the "St. Louis and O'Fallon Railway Company and Manufacturers' Railway Company vs. United States and Interstate Commerce Commission," on the ground that the Commission failed to consider present cost of construction or reproduction as one of "the elements of value recognized by the law of the land for rate making purposes," as directed by Section 15a of the Interstate Commerce Act (added thereto by the Transportation Act of 1920).

Changing from Direct to Alternating Current

The New York Public Service Commission has held that the fact that hereafter all new buildings in particular districts within the area served by the New York Edison Company will be required to install alternating current elevators does not constitute discrimination.

This recognizes the policy of the company to restrict the use of direct current, as far as possible, to those localities where direct current is now generally supplied, and wherever possible to substitute alternating current.

A Utility Not an Insurer of Continuous Service

The Supreme Court of Wisconsin has held that a public utility cannot be held liable for interruptions to its service when such interruptions are due to conditions over which it has no control, provided that it has exercised reasonable and practical care, as well as foresight and diligence to prevent such interruptions.

Public Relations Meeting

(*Continued from page* 673)

tics. These services are being sent to executives.

Mr. Oxley stated that the movietone films of Mr. Edison, Sir Ernest Benn, Sir Kengo Mori and Signor Alberto Pirelli, and the convention film, are proving a tremendous success, the films being completely booked for September and October. In spite of the fact the association ordered two additional prints of Sir Ernest Benn and Mr. Edison, a total of five prints of these two films, the association has been unable to fill all requests.

The statistical chapter of the N. E. L. A. Handbook has been revised and copies are being forwarded to all who received the handbook. Mr. Oxley also stated that in accordance with the instructions of the Section's Executive Committee at its last meeting, the address by Martin J. Insull on "Complete Service" was published in the N. E. L. A. BULLETIN and also in pamphlet form and forwarded to all executives. The budget of the section has been approved by the officers of the section and has gone to the Budget Committee for consideration and approval.

Upon motion by Mr. Owens, seconded by Mr. Herrington and carried, the following appointees to represent the Public Relations National Section on the Public Policy Committee were approved: Harry Reid, T. A. Kenney, Guy W. Talbot and D. C. Green.

Back Numbers of N. E. L. A. Bulletin Available

A FORMER member of the N. E. L. A. who has been retired on pension by his company writes that he has unbound N. E. L. A. Bulletins, covering a period of several years, which he will dispose of for a nominal sum. The years covered are 1922, with the exception of the April issue, and 1923 to 1928 inclusive. He also has the proceedings of the Pennsylvania Electric Association for 1919 to 1927 inclusive.

Anyone interested may address the editor of the Bulletin and the letter will be forwarded to the owner of the books.

Picked up from

ELECTRICAL NEWS ITEMS

Issued weekly by Department of Public Information, National Electric Light Association, 420 Lexington Avenue, New York City. All or part may be used without further notice and with or without credit being given.

Electricity Supplants Harpoon in Whaling

THE U. S. Department of Commerce has announced a new invention for killing whales by electricity which is said to have been perfected by a Norwegian engineer. It has been tried out recently in practice near the Faer Islands.

The full text of the Department's statement is as follows:

"It is thought by those interested that the new invention will revolutionize the catching of whales from both the points of technic and economy. Installation of the necessary machinery is estimated to cost less than 3000 kroner (about $700), and several of the boats expecting to participate in this season's catch are already having the new equipment installed.

"The advantages of the new method are several, one of the most important of which is the instantaneous death of the whale, even if hit in a spot not ordinarily mortal. Furthermore, the dead whale remains floating, while by the old methods the whales usually sink and the lifting of them causes much loss of time and wear and tear of machinery.

"A stock company has been formed to exploit the new invention. The board of directors consists of several well known men in the whaling industry, besides the inventor. The company controls eight or nine patents, and patent rights will probably be rented by payment of royalty on each barrel of oil extracted from whales killed by the new method."

New Orleans Prepares for Mardi Gras by Installing Fine Lighting System

IN anticipation of the Mardi Gras of 1930, New Orleans is planning the installation of one of the finest lighting systems in the country on its wide and picturesque business thoroughfare, Canal Street. From the river, through the business section for a distance of more than a mile, 108 handsomely designed lighting standards with three 1000 watt lamps on each, will be spaced to illuminate the 180 foot wide street with brilliant light. The standard will be placed in the neutral ground alongside the trolley tracks, between the roadway and the tracks.

Talking Movies of N. E. L. A. Convention Shown in London

POINTING out that the talking motion picture films of speeches by Sir Ernest Denn, the noted English Economist; Dr. Alberto Pirelli, president of the International Chamber of Commerce, and Thomas A. Edison, which were shown at the annual convention of the National Electric Light Association in Atlantic City, represented the first employment of the sound film by an industry, P. L. Thomson, director of public relations of the Western Electric Company, gave the first public showing of these films in London, August 27.

Commenting on this use of the "talking movie," the *Electrician* (London) says: "The first notable use of the talkie outside the entertainment field was that made by the National Electric Light Association of America when it obtained talking films of the distinguished men in other countries, rushed the films over to the States, and reproduced them as part of the business program at their annual convention in Atlantic City, in June. Speakers whose voices were heard in this way included Sir Ernest Benn (chairman of Benn Brothers, Ltd.), Signor Pirelli, and T. A. Edison * * *

"J. H. McGraw (chairman of the board of McGraw-Hill Company), who had heard the speeches reproduced at the Convention, testified to the remarkable effect produced by them on the American delegates, and predicted that the 'sound picture' would become one of the greatest factors in promoting international good feeling and understanding."

Lord Birkenhead on Electrical Progress

IN an interesting statement appearing in the New York *Times* of Sept. 19, the Earl of Birkenhead, chairman of the Greater London and Counties, Ltd. (British affiliate of the Utilities Power and Light Corporation), expresses the opinion that "industrial development goes hand in hand with the progress of electric energy," and says that most of his countrymen have noted with interest the great industrial development in the U. S. and its consequent prosperity.

Discussing the causes of the decrease in the United States of production costs, Lord Birkenhead credits the construction of great electric generating stations at strategic locations with being the most powerful factor in bringing about these reductions. "The superpower system," he said, "has enormously extended the area within which energy is distributable and rendered possible the interchange of facilities with other power stations."

After commenting on the increase in the use of electricity in the home and on the farm in this country, he stated that a cheap and abundant supply of electricity is the aim in Great Britain. "We feel that this will have a beneficent effect upon British industry," he added, "and tend to alleviate the unemployment problem and place Great Britain in a better position to compete in the markets of the world."

I. E. S. Convention

(*Continued from page* 679)

An entire session of the convention proper was devoted to "Light's Golden Jubilee," C. H. Sharp acting as chairman. Dr. Elmer A. Sperry, E. J. Cattell of Philadelphia and Representative C. A. Eaton gave reminiscences of the inventor and paid tribute to him.

An analysis showing the relation of light to power in twenty industrial plants was offered by H. E. Cook, Detroit Edison Company, at the Wednesday session. Mr. Cook concluded that "power installations are in general constant in capacity, whereas lighting affords a variable and hence an opportunity for additional revenue through the increase which is procurable by increased efforts at saturation on the part of the serving utility."

Two sessions were devoted to the consideration of daylighting factors, designs and practices in illuminating engineering work, effects of ultra-violet radiation and the influence of window materials, synthetic sunlight and photoluminescence.

Entertainment features included the president's reception, a visit to P. S. du Pont's illuminated fountain and gardens, a banquet on Thursday evening and a golf tournament. Officers for the coming year were announced as follows: President, H. H. Magsdick; vice-presidents, W. F. Little and Julius Daniels; treasurer, C. L. Law; general secretary, E. H. Hobbie.

OFFICERS—DIVISIONS—SECTIONS—BUREAUS—COMMITTEES—CONVENTIONS—MEETINGS—NEW MEMBERS

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Vice-President, W. A. Jones
Cities Service Co., New York, N. Y.

Vice-President, J. F. Owens
Oklahoma Gas & Electric Co.,
Oklahoma City, Okla.

Vice-President, Marshall E. Sampsell
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Vice-President, Edwin Gruhl
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Managing Director, Paul S. Clapp
National Electric Light Association,
New York, N. Y.

Secretary, A. Jackson Marshall
National Electric Light Association,
New York, N. Y.

Members-at-Large

(*Terms expiring June 30th,* 1930)

P. S. Arkwright, *ex officio,* Georgia Power Co., Atlanta, Ga.

Charles W. Appleton, General Electric Co., New York, N. Y.

D. C. Barnes, Stone & Webster, Inc., Boston, Mass.

C. L. Collens, Reliance Electric & Manufacturing Co., Cleveland, Ohio

H. P. Liversidge, The Philadelphia Electric Co., Philadelphia, Pa.

James R. Strong, Tucker Electrical Construction Co., New York, N. Y.

(*Terms expiring June 30th,* 1931)

John P. Coghlan, Pacific Gas & Electric Co., San Francisco, Cal.

F. A. Merrick, Westinghouse Electric & Manufacturing Co., New York, N. Y.

(*Terms expiring June 30th,* 1932)

G. E. Cullinan, Graybar Electric Co., Inc., New York, N. Y.

E. W. Lloyd, Commonwealth Edison Co., Chicago, Ill.

Harry Reid, National Electric Power Co., New York, N. Y.

National Section Chairmen

Accounting—W. R. Emerson, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

Commercial—Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

Engineering—A. D. Bailey, Commonwealth Edison Co., Chicago, Ill.

Public Relations—Harry Reid, National Electric Power Co., New York, N. Y.

Geographic Division Presidents

Canadian—P. S. Gregory, The Shawinigan Water & Power Co., Montreal, Canada

Eastern—John F. Ford, The Philadelphia Electric Co., Philadelphia, Pa.

East Central—L. B. Herrington, Kentucky Utilities Co., Louisville, Ky.

Great Lakes—G. C. Neff, Wisconsin Power & Light Co., Madison, Wis.

Middle West—A. E. Bettis, Kansas City Power & Light Co., Kansas City, Mo.

New England—C. H. Hodskinson, The Edison Electric Illuminating Co., Boston, Mass.

North Central—Thomas T. Parker, Northwestern Public Service Co., Huron, S. D.

Northwest—M. L. Hibbard, Idaho Power Co., Boise, Idaho

Pacific Coast—E. B. Criddle, Southern Sierras Power Co., Riverside, Cal.

Rocky Mountain—W. D. Johnston, Mountain States Power Co., Casper, Wyo.

Southeastern—T. H. Tutwiler, Memphis Power & Light Co., Memphis, Tenn.

Southwestern—Fred W. Insull, Public Service Co. of Oklahoma, Tulsa, Okla.

Public Policy Committee

Chairman, P. S. Arkwright, Georgia Power Co., Atlanta, Ga.

Vice-Chairman, C. E. Groesbeck, Electric Bond & Share Co., New York, N. Y.

R. H. Ballard, Southern California Edison Co., Los Angeles, Cal.

Henry G. Bradlee, Stone & Webster, Inc., Boston, Mass.

N. F. Brady, The New York Edison Co., New York, N. Y.

B. C. Cobb, Allied Power & Light Corp., New York, N. Y.

Frank L. Dame, The North America Co., New York, N. Y.

J. E. Davidson, Nebraska Power Co., Omaha, Neb.

Henry L. Doherty, Henry L. Doherty & Co., New York, N. Y.

Alex Dow, The Detroit Edison Co., Detroit, Mich.

Charles L. Edgar, The Edison Electric Illuminating Co., Boston, Mass.

Halford Erickson, Byllesby Engineering & Management Corp., Chicago, Ill.

W. W. Freeman, Columbia Gas & Electric Corp., New York, N. Y.

John F. Gilchrist, Commonwealth Edison Co., Chicago, Ill.

P. G. Gossler, Columbia Gas & Electric Corp., New York, N. Y.

A. R. Graustein, International Paper Co., New York, N. Y.

Franklin T. Griffith, Portland Electric Power Co., Portland, Ore.

Edwin Gruhl, The North American Co., New York, N. Y.

A. F. Hockenbeamer, Pacific Gas & Electric Co., San Francisco, Cal.

Martin J. Insull, Middle West Utilities Co., Chicago, Ill.

Samuel Insull, Commonwealth Edison Co., Chicago, Ill.

W. A. Jones, Cities Service Co., New York, N. Y.

John W. Lieb, The New York Edison Co., New York, N. Y.

Thomas W Martin, Alabama Power Co., Birmingham, Ala.

Thomas N. McCarter, Public Service Electric & Gas Co., Newark, N. J.

John B. Miller, Southern California Edison Co., Los Angeles, Cal.

Sidney Z. Mitchell, Electric Bond & Share Co., New York, N. Y.

J. J. O'Brien, H. M. Byllesby & Co., Chicago, Ill.

J. F. Owens, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

R. F. Pack, Northern States Power Co., Minneapolis, Minn.

A. W. Robertson, Westinghouse Electric & Manufacturing Co., New York, N. Y.

Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

H. T. Sands, Electric Bond & Share Co., New York, N. Y.

Paul A. Schoellkopf, The Niagara Falls Power Co., Buffalo, N. Y.

M. S. Sloan, The New York Edison Co., New York, N. Y.

Frank W. Smith, The United Electric Light & Power Co., New York, N. Y.

R. P. Stevens, Allied Power & Light Corp., New York, N. Y.

Frank M. Tait, The Dayton Power & Light Co., Dayton, Ohio.

George N. Tidd, American Gas & Electric Co., New York, N. Y.

Herbert A. Wagner, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

Owen D. Young, General Electric Co., New York, N. Y.

John E. Zimmermann, The United Gas Improvement Co., Philadelphia, Pa.

Public Relations National Section Representatives

D. C. Green, Electric Bond & Share Co., New York, N. Y.

T. A. Kenney, Allied Power & Light Corp., New York, N. Y.

Harry Reid, National Electric Power Co., New York, N. Y.

Guy W. Talbot, Pacific Power & Light Co., Portland, Ore.

Geographic Divisions State Associations

Canadian Division

(*Entire Dominion of Canada*)

Canadian Electrical Association

President, P. S. Gregory, The Shawinigan Water & Power Co., Montreal, Can.; *Secretary,* H. M. Lyster, Room 405, Power Bldg., Montreal, Can.

(*This Division Has No State [Provincial] Section*)

*Eastern Division

(*New Jersey, New York, Pennsylvania*)

President, F. R. Phillips, Duquesne Light Co., Pittsburgh, Pa.; *Managing Director,* A. B. Millar, Telegraph Bldg., Harrisburg, Pa.

Empire State Gas and Electric Association

President, William R. Welsh, New York & Richmond Gas Co., Stapleton, S. I., N. Y.; *Secretary,* Charles H. B. Chapin, 5618 Grand Central Terminal Bldg., New York, N. Y.

New Jersey Electric Association

President, C. H. Howell, Atlantic City Electric Co., Atlantic City, N. J.; *Secretary,* S. F. Delany, Atlantic City Electric Co., Atlantic City, N. J.

Pennsylvania Electric Association

President, F. R. Phillips, Duquesne Light Co., Pittsburgh, Pa.; *Managing Director,* A. B. Millar, Telegraph Bldg., Harrisburg, Pa.

East Central Division

(*Kentucky, Ohio, West Virginia*)

President, L. B. Herrington, Kentucky Utilities Co., Louisville, Ky.; *Secretary-Treasurer,* D. L. Gaskill, 603½ Broadway, Greenville, Ohio.

Kentucky Association of Public Utilities

President, Samuel Riddle, Louisville Railway Co., Louisville, Ky.; *Secretary,* E. F. Kelley, Louisville Railway Co., Louisville, Ky.

Public Utilities Association of West Virginia

President, A. C. Spurr, Wheeling Traction Co., Wheeling, W. Va.; *Secretary,* A. Bliss McCrum, Box 1483, Charleston, W. Va.

Great Lakes Division

(*Illinois, Indiana, Michigan, Wisconsin*)

President, G. C. Neff, Wisconsin Power & Light Co., Madison, Wis.; *Secretary,* Tom C. Polk, 140 South Dearborn St., Chicago, Ill.

Illinois State Electric Association

President, E. F. Kelly, Central Illinois Public Service Co., Springfield, Ill.; *Secretary-Treasurer,* George W. Schwaner, 205 Illinois Mine Workers Bldg., Springfield, Ill.

Indiana Electric Light Association

President, C. V. Sorenson, Central Indiana Power Co., Indianapolis, Ind.; *Secretary-Treasurer,* William Stokes, 1548 Consolidated Bldg., Indianapolis, Ind.

Michigan Electric Light Association Section

President, E. L. Edward, Michigan Electric Power Co., Lapeer, Mich.; *Secretary-Treasurer,* Herbert Silvester, The Detroit Edison Co., Ann Arbor, Mich.

Wisconsin Utilities Association

President, G. W. Van Derzee, Milwaukee Electric Railway & Light Co., Milwaukee, Wis.; *Executive Secretary,* John N. Cadby, 502 Brumder Bldg., 105 Wells St., Milwaukee, Wis.

*Middle Atlantic Division

(*To Consist of Delaware, District of Columbia, Maryland, Virginia*)

Maryland Utilities Association

President, H. T. Connolly, Washington, Baltimore & Annapolis Electric Railroad Company, Baltimore, Md.; *Secretary,* D. E. Kinnear, United Railways & Electric Company, Baltimore, Md.

Public Utilities Association of Virginia

President, A. W. Higgins, Virginia Public Service Co., Charlottesville, Va.; *Secretary,* A. B. Tunis, 301 East Grace Street, Richmond, Va.

Middle West Division

(Iowa, Kansas, Missouri, Nebraska)

President, A. E. Bettis, Kansas City Power & Light Co., Kansas City, Mo.; *Managing Director*, Thorne Browne, 1527 Sharp Bldg., Lincoln, Neb.

Iowa Section

President, C. S. Macy, Iowa Power & Light Co., Adel, Iowa; *Managing Director*, Joe Carmichael, 310 Crocker Bldg., Des Moines, Iowa.

Kansas Section

President, Frank M. Stone, Kansas Utilities Co., Fort Scott, Kan.; *Secretary*, H. Lee Jones, 820 Kansas Avenue, Topeka, Kan.

Missouri Association of Public Utilities

President, T. J. Strickler, Kansas City Gas Co., Kansas City, Mo.; *Secretary-Treasurer*, F. D. Beardslee, 315 North Twelfth Street, St. Louis, Mo.

Nebraska Section

President, C. W. Amidon, Central Power Co., Grand Island, Neb.; *Managing Director*, Thorne Browne, 1527 Sharp Bldg., Lincoln, Neb.

New England Division

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)

President, C. H. Hodskinson, The Edison Electric Illuminating Co., Boston, Mass.; *Secretary*, Miss O. A. Bursiel, Room 1113 Statler Bldg., 20 Providence Street, Boston, Mass.

(This Division Has No State Sections)

North Central Division

(Minnesota, North Dakota, South Dakota)

North Central Electric Association

President, Thomas T. Parker, Northwestern Public Service Co., Huron, S. D.; *Secretary*, John W. Lapham, 803-804 Plymouth Bldg., Minneapolis, Minn.

(This Division Has No State Sections)

Northwest Division

(Alaska, Idaho, Montana, Oregon, Utah, Washington)

Northwest Electric Light and Power Association

President, M. L. Hibbard, Idaho Power Co., Boise, Idaho; *Secretary*, Berkeley Snow, Room 1206, Spaulding Bldg., Portland, Ore.

(This Division Has No State Sections)

Pacific Coast Division

(Arizona, California, Hawaii, Nevada, Philippine Islands)

Pacific Coast Electrical Association

President, E. B. Criddle, Southern Sierras Power Co., Riverside, Cal.; *Secretary*, Samuel H. Taylor, Suite 729-730, 447 Sutter Street, San Francisco, Cal.

Arizona Utilities Association

President, M. A. Pooler, Tucson Gas, Electric Light & Power Co., Tucson, Ariz.; *Secretary*, L. C. McCullough, 134 South Central Avenue, Phoenix, Ariz.

Rocky Mountain Division

(Colorado, New Mexico, Wyoming)

President, W. D. Johnston, Mountain States Power Co., Casper, Wyo.; *Secretary*, O. A. Weller, Public Service Co. of Colorado, Denver, Colo.

The Colorado Utilities Association

President, H. S. Robertson, Denver Tramway Corp., Denver, Colo.; *Secretary*, O. A. Weller, Public Service Co. of Colo., Denver, Colo.

New Mexico Utilities Association

President, W. W. Nielsen, New Mexico Power Co., Santa Fe, N. M.; *Secretary-Treasurer*, Bernard L. Wiles, Albuquerque Gas & Electric Co., Albuquerque, N. M.

Wyoming Utilities Association

President, W. D. Johnstone, Mountain States Power Co., Casper, Wyo.; *Secretary*, F. A. Probst, Mountain States Telephone & Telegraph Co., Casper, Wyo.

Southeastern Division

(Alabama, Cuba, Florida, Georgia, North Carolina, South Carolina, Tennessee, Porto Rico)

President, T. H. Tutwiler, Memphis Power & Light Co., Memphis, Tenn.; *Secretary*, C. M. Kilian, 207-8 Bona Allen Bldg., Atlanta, Ga.

Southwestern Division

(Arkansas, Louisiana, Mississippi, Oklahoma, Texas)

President, Fred W. Insull, Public Service Co. of Oklahoma, Tulsa, Okla.; *Secretary*, S. J. Ballinger, San Antonio Public Service Co., San Antonio, Tex.

Arkansas Utilities Association

President, W. E. Bann, Southwestern Gas & Electric Co., Texarkana, Tex.; *Secretary*, R. I. Brown, Arkansas Central Power Co., Little Rock, Ark.

Mississippi Electric League

President, A. H. Jones, Jones-Johnson Co., McComb, Miss.; *Secretary*, A. R. Riddick, A. G. Riddick, Inc., Jackson, Miss.

Oklahoma Utilities Association

President, Thomas R. Weymouth, Oklahoma Natural Gas Corp., Tulsa, Okla.; *Secretary*, Edward F. McKay, 1020 Petroleum Bldg., Oklahoma City, Oyla.

Southwestern Public Service Association

President, Knox Lee, Southwestern Gas & Electric Co., Marshall, Tex.; *Secretary*, E. N. Willis, 403 Slaughter Bldg., Dallas, Tex.

*Note: This Division is in Process of Formation.

Sections, Bureaus and Committees

Chairmen's names only listed here

Special National Committees

Advertising Committee—(To be determined.)

Charles A. Coffin Prize Committee—M. S. Sloan, The New York Edison Co., New York, N. Y.

Codes and Standards Committee—Irvin W. Day, The Connecticut Light & Power Co., Waterbury, Conn.

Constitution and By-Laws Committee—R. F. Pack, Northern States Power Co., Minneapolis, Minn.

Electrification of Steam Railroads Committee—Britton I. Budd, Public Service Co. of Northern Illinois, Chicago, Ill.

Exhibition Committee—E. W. Goldschmidt, Wagner Electric Corp., New York, N. Y.

Finance Committee—Sidney Z. Mitchell, Electric Bond & Share Co., New York, N. Y.

Lamp Committee—Frank W. Smith, The United Electric Light & Power Co., New York, N. Y.

Prize Awards Committee—W. H. Onken, Jr., *Electrical World*, New York, N. Y.

Public Policy Committee—P. S. Arkwright, Georgia Power Co., Atlanta, Ga.

Rate Research Committee—L. R. Nash, Stone & Webster, Inc., Boston, Mass.

Water Power Development Committee—Paul A. Schoellkopf, The Niagara Falls Power Co., Buffalo, N. Y.

General National Committees

*Civic Development Committee—John B. Reynolds, Middle West Utilities Co., Chicago, Ill.

*Educational Committee—Fred R. Jenkins, Commonwealth Edison Co., Chicago, Ill.

*Insurance Committee—W. H. Sawyer, Stevens & Wood, Inc., New York, N. Y.

*Membership Committee—A. Jackson Marshall, National Electric Light Association, New York, N. Y.

*Rural Electric Service Committee—Eugene Holcomb, Consumers Power Co., Jackson, Mich.

Accounting National Section

*Section's Executive Committee—W. R. Emerson, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

Budget Committee—B. F. Rodey, The United Electric Light & Power Co., New York, N. Y.

*Classification of Accounts Committee—H. C. Hasbrouck, C. H. Hopson & Co., New York, N. Y.

*Customers' Records Committee—E. W. Korsmeyer, Henry L. Doherty & Co., New York, N. Y.

Exhibit Committee—T. A. Wallace, Henry L. Doherty & Co., New York, N. Y.

*Fixed Capital Committee—Thomas M. Ford, The Philadelphia Electric Co, Philadelphia, Pa.

*General Records Committee—C. E. McBride, Electric Bond & Share Co, New York, N. Y.

*Purchasing and Storeroom Committee—K. C. Campbell, The Detroit Edison Co., Detroit, Mich.

*Statistics Committee—Harry A. Snow, The Detroit Edison Co., Detroit, Mich.

Commercial National Section

*Section's Executive Committee—Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

*Commercial and Industrial Power and Heating Bureau—V. M. F. Tallman, Charles H. Tenney & Co., Boston, Mass.

Commercial Cooking Committee—O. Wilhelmy, The Union Gas & Electric Co., Cincinnati, Ohio

General Power Committee—H. C. Thuerk, Associated Gas & Electric System, New York, N. Y.

Industrial Heating Committee—J. L. Faden, The Edison Electric Illuminating Co., Boston, Mass.

*Lighting Bureau—M. E. Skinner, New York Power & Light Corp., Albany, N. Y.

Commercial and Industrial Lighting Committee W. H. Horton, Jr., West Penn Power Co., Pittsburgh, Pa.

Electrical Advertising Committee—C. J. Eaton, Middle West Utilities Co., Chicago, Ill.

Home Lighting Committee—W. T. Blackwell, Public Service Electric & Gas Co., Newark, N. J.

Street Lighting Committee—R. J. Malcomson, Public Service Co. of Northern Illinois, Chicago, Ill.

*Merchandising Bureau—Frank D. Pembleton, Public Service Electric & Gas Co., Newark, N. J.

Domestic Electric Range Committee—Frank A. Coupal, Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.

Merchandise Sales Committee—C. L. Harold, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

Refrigeration Committee—C. L. Dunn, The Ohio Public Service Co., Cleveland, Ohio.

Water Heating Committee—Norman T. Wilcox, Stone & Webster, Inc., Boston, Mass.

*Customer Relations Committee—H. T. East, Public Service Co. of Northern Illinois, Chicago, Ill.

*Wiring Sales Committee—A. P. Good, Commonwealth Edison Co., Chicago, Ill.

Engineering National Section

*Section's Executive Committee—A. D. Bailey, Commonwealth Edison Co., Chicago, Ill.

*Accident Prevention Committee—C. R. Beardsley, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

*Electrical Apparatus Committee—R. A. Hentz, The Philadelphia Electric Co., Philadelphia, Pa.

Engineering Administration Committee—W. E. Mitchell, Georgia Power Co., Atlanta, Ga.

Engineering Research Committee—C. F. Hirshfeld, The Detroit Edison Co., Detroit, Mich.

*Hydraulic Power Committee—Byron E. White, Utica Gas & Electric Co, Utica, N. Y.

*Inductive Coordination Committee—H. L. Wills, Georgia Power Co, Atlanta, Ga.

*Meter Committee—A. S. Albright, The Detroit Edison Co, Detroit, Mich.

*Overhead Systems Committee—Sydney Alling, The Rochester Gas & Electric Corp., Rochester, N. Y.

*Power System Engineering Committee—L. W. W. Morrow, *Electrical World*, New York, N. Y.

*Prime Movers Committee—R. D. DeWolf, The Rochester Gas & Electric Corp., Rochester, N. Y.

*Underground Systems Committee—G. C. McCabe, The Detroit Edison Co., Detroit, Mich.

PUBLIC RELATIONS NATIONAL SECTION

***Section's Executive Committee**—HARRY REID, National Electric Power Co., New York, N. Y.

***Cooperation with Educational Institutions**—JOHN F. GILCHRIST, Commonwealth Edison Co., Chicago, Ill.

***Customer Ownership**—W. H. HODGE, Byllesby Engineering & Management Corp., Chicago, Ill.

***Industrial Relations Committee**—HOMER E. NIESZ, Commonwealth Edison Co., Chicago, Ill.

***Information Bureau Committee**—T. A. KENNEY, Allied Power & Light Corp., New York, N. Y.

Manufacturers' Advertising Committee—(To be determined.)

***Public Speaking Committee**—W. S. VIVIAN, Middle West Utilities Co., Chicago, Ill.

***Relations with Financial Institutions Committee**—CHARLES B. STUART, Halsey Stuart & Co., New York, N. Y.

***Women's Committee**—MISS SARA HARRIS, Utica Gas & Electric Co., Utica, N. Y.

***Provision is made for a representative from each Geographic Division.**

CONVENTIONS AND MEETINGS

Meeting of the Section, Bureaus and Committees of the National Electric Light Association are shown in roman type; those of other associations in italics

1929

October

1 Executive Committee, Engineering National Section, William Penn Hotel, Pittsburgh, Pa.

1 Hydraulic Power Committee, William Penn Hotel, Pittsburgh, Pa.

1 Overhead Systems Committee, William Penn Hotel, Pittsburgh, Pa.

1 Power System Engineering Committee, William Penn Hotel, Pittsburgh, Pa.

1 Prime Movers Committee, William Penn Hotel, Pittsburgh, Pa.

1–2 Accident Prevention Committee, William Penn Hotel, Pittsburgh, Pa.

1–4 *American Electric Railway Association Convention and Exhibit, Atlantic City Auditorium, Atlantic City, N. J.*

1–4 *National Safety Council, Stevens Hotel, Chicago, Ill.*

2–3 Electrical Apparatus Committee, William Penn Hotel, Pittsburgh, Pa.

2–3 Inductive Coordination Committee, William Penn Hotel, Pittsburgh, Pa.

2–3 Meter Committee, William Penn Hotel, Pittsburgh, Pa.

2–3 Underground Systems Committee, William Penn Hotel, Pittsburgh, Pa.

3–4 Wisconsin Utilities Association, Commercial Section, Hotel Retlow, Fond du Lac, Wis.

7–10 *Third National Fuels Meeting, American Society of Mechanical Engineers, Bellevue-Stratford Hotel, Philadelphia, Pa.*

7–11 *National Electrical Manufacturers Association, Wardman Park Hotel, Washington, D. C.*

7–11 *National Electrical Manufacturers Association, Washington, D. C.*

10–12 Third Annual Conference for Rural Service Men of Electric Light and Power Companies, Agricultural Experiment Station, Purdue University, Lafayette, Ind.

10–12 *Third Annual Conference on Rural Electrification, Purdue University, Lafayette, Ind.*

14–18 *American Gas Association, Atlantic City, N. J.*

17–18 Kansas Section, Wichita, Kan.

22 ***The Electric Association, Chicago, Ill.***

22 Public Policy Committee, Edison Building, Chicago, Ill.

23–26 Great Lakes Division Engineering Section, Lorraine Hotel, Madison, Wis.

23–24 Public Utilities Association of West Virginia, Wheeling, W. Va.

24 General Session and Inspection trip, Accounting National Section, Palmer House, Chicago, Ill.

24 Budget Committee, Palmer House, Chicago, Ill.

24 Classification of Accounts Committee, Palmer House, Chicago, Ill.

24 Customer's Records Committee, Palmer House, Chicago, Ill.

24 Fixed Capital Committee, Palmer House, Chicago, Ill.

24 General Records Committee, Palmer House, Chicago, Ill.

24 Purchasing and Storeroom Committee, Palmer House, Chicago, Ill.

24 Statistics Committee, Palmer House, Chicago, Ill.

24–25 *American Engineering Council, Mayflower Hotel, Washington, D. C.*

25 Executive Committee, Accounting National Section, Palmer House, Chicago, Ill.

28–29 North Central Electric Association, Accounting Section, Nicollet Hotel, Minneapolis, Minn.

November

21–22 Public Utilities Association of Virginia, Chamberlain-Vanderbilt Hotel, Old Point Comfort, Va.

December

2–4 Secretaries' Conference, Drake Hotel, Chicago, Ill.

2–4 *American Institute of Electrical Engineers, Regional meeting, Chicago, Ill.*

2–6 *American Institute of Mechanical Engineers, Annual meeting, New York, N. Y.*

January

20–21 North Central Electric Association, Commercial Section, St. Paul Hotel, St. Paul, Minn.

27–31 *American Institute of Electrical Engineers, Santa Monica, Cal.*

February

24–25 North Central Electric Association, Engineering Section, Nicollet Hotel, Minneapolis, Minn.

April

28–30 *Chamber of Commerce of U. S. A., Washington, D. C.*

May

1–2 *Chamber of Commerce of U. S. A., Washington, D. C.*

12–16 *National Fire Protection Association, Atlantic City, N. J.*

June

North Central Electric Association, Managerial, Alex Johnson Hotel, Rapid City, S. D.

16–20 NATIONAL ELECTRIC LIGHT ASSOCIATION, EXPOSITION AUDITORIUM, SAN FRANCISCO, CAL.

23–27 *American Institute of Electrical Engineers, Toronto, Can.*

NEW MEMBERS

Light and Power Companies, Employees of Light and Power Companies, Invited Persons, Manufacturing Companies, Employees of Manufacturing Companies, Associated Companies, Employees of Associated Companies and Foreign Organizations who have recently become Members of the National Electric Light Association.

NOTE: Names of new individual members are shown in the following order: First, in italics, post office address of company employing new members, and on the same line, in Roman letters, the name of the company employing new members; on succeeding indented lines, names of new members followed by post office address.

Electric Light and Power Companies (Class A)

New York, Geneva, Empire Gas & Electric Company

Employees of Electric Light and Power Companies (Class B)

Alabama, Birmingham, Alabama Power Company
  E. A. Wilson
Alabama, Birmingham, Birmingham Electric Company
  J. A. Griffith
  Roy H. Knox
Arizona, Phoenix, Central Arizona Light & Power Company
  R. H. Bradford
  J. W. Jantzen
California, San Francisco, Pacific Gas & Electric Company
  Fred P. Hanson (Emeryville, Cal.)
  C. R. Stanley
Florida, Pensacola, Gulf Power Company
  Robert C. Alley
Florida, St. Petersburg, Florida Power Corporation
  T. Carlisle Crump
  Mrs. Myra Lee Milner
Florida, Miami, Florida Power & Light Company
  J. C. Jones
  Howard N. Snyder
Georgia, Atlanta, Georgia Power Company (Empire Const. Co.)
  H. F. Armstrong
  F. A. Jordan
  J. E. Stott
  Sam B. Wilson
Georgia, Columbus, Columbus Electric & Power Company
  A. P. Newberry
Georgia, Columbus, South Georgia Power Company
  G. F. Bunn (Montezuma, Ga.)
  C. S. Paullin (Albany, Ga.)
Illinois, Chicago, Public Service Company of Northern Illinois
  Everett L. Beers
Indiana, South Bend, Indiana & Michigan Electric Company
  H. M. Wallsmith (Benton Harbor, Mich.)
Maine, Rumford, Rumford Falls Light & Water Company
  Edwin C. Gallant
Massachusetts, Boston, Edison Electric Illuminating Company of Boston
  John T. Higgins
Massachusetts, Lowell, The Lowell Electric Light Corp.
  Louis S. Leavitt
New Hampshire, Manchester, Public Service Company of New Hampshire
  Romie W. Wilson
New York, Brooklyn, Brooklyn Edison Co., Inc.
  Edward Joseph Balfe
  Lester George Barrow
  Louis V. Claps
  John M. Driscoll
  Benjamin Duffield Hamilton
  S. E. Lawrence
  Otto William Uhlig
  Roy L. Webb
  Roy S. Williams
New York, New York, W. S. Barstow & Company
  C. Ridgely Kemp (Reading, Pa.)
New York, New York, The United Electric Light & Power Company
  Stephen S. Weil
North Carolina, Raleigh, Carolina Power & Light Company
  H. I. Seeley (Asheville, N. C.)
  W. H. Weatherspoon
North Carolina, Wilmington, Tide Water Power Company
  Raymond Hunt
  A. E. Townsend

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Be Damned If You Do and Be Damned If You Don't, 701

Amplifier

The electrical industry is meticulously truthful in the material it sends out for the information of its public but it has no intention of being hung, however pleasing that spectacle might be to "the incompetents, the parasites, the passengers, the incapables and the pauper-minded."

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THE PRESIDENT'S PAGE

Bargains In Electricity

WITH investment costs per kilowatt of installed capacity rising and revenues per dollar of investment falling, the serious need of the power and light industry is increased sales.

It has been said of us many times that we are good engineers but poor salesmen. Under the circumstances, there may be profit in considering advice addressed to us by one who has made an outstanding record both as manufacturer and salesman. Henry Ford recently declared:

"Get electricity across to the people by the same way that automobiles got across to them. Create a desire for what electricity will do for them—You are not selling companies. You are selling electricity for what it can do in homes, shops, on the highways or on the farm."

Have we created a desire for what electric service will do for people, more particularly what it will do in homes, where we lag in sales and where increased business can be most profitably handled? Have we adequately sold the advantages and merits of electric service?

We have not. The proof is obtainable in sales figures, in the number of under-equipped homes, and in the attitude of mind of a large proportion of domestic users.

We have excused our inadequacy on many grounds. Analysis of the industry's statistics indicates that the time for excuses has ceased and the time for action is at hand. I suggest:

1. Aggressive selling of the advantages, merits and benefits of electric service.

2. Rate structures built to stimulate sales by putting a premium of lower price on increased use of current.

3. Faith in the common sense of the American people who don't turn down a bargain when they see one.

We have bargains to offer. Why not make the consumers see them?

President.

N·E·L·A· BULLETIN

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NATIONAL ELECTRIC LIGHT ASSOCIATION

A Voluntary Organization of Companies Engaged In, and Individuals Affiliated With, or Interested In, the Electric Light and Power Industry: "Organized to Advance the Art and Science of the Production, Distribution and Use of Electrical Energy for Light, Heat and Power for Public Service."

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News from the Geographic Divisions

THE BULLETIN is glad to announce that, with this issue, a systematic reporting of news of the Geographic Divisions is inaugurated. The secretaries of the several Divisions have been invited to contribute each month a news letter of association activities within their respective divisions. At the time of going to press most of them had responded accepting this duty, with half of them sending their contributions with the letters of acceptance.

We believe that such pictures of the nationwide activities of the association as will be reflected in the Geographic Division news letters will make both interesting and valuable reading. While in most cases each division publishes its own organ, distribution of thee magazines is usually limited to these divisions in which they originate. Most of the divisional activities have more than a local appeal, and all should have a stimulating effect upon readers everywhere.

Young Demostheneses

THE chief worry of many a man has been his lack of ability to stand on his feet and tell a group of people what he thinks. Brilliant conversationalists—oftentimes—when only two or three people are around, they find themselves either as dumb as an oyster, or as red as another succulent denizen of the deep, when called upon to address a meeting. And the pity of it is it is so unnecessary, we are told.

In the final analysis a speech is but a variety of ordinary conversation. A little louder in tone, a little more thought about what one is to say, and if desired, a bit more of a gesture for emphasis—and that's all there is to it. Every man and woman is a potential public speaker. Not all of them are capable of becoming spellbinders, but at least most of them, some say all, can develop into creditable speakers.

The electrical industry is fortunate in having a goodly share of articulate representatives, and for this the National Public Speaking Committee and its subordinate committees are in a great part responsible. Through their encouragement and leadership thousands and thousands of employees of the industry have been enabled to enjoy that cocky feeling that comes after a message has been triumphantly put across an audience. The National Employee's Speaking Contest now getting under way will open the eyes of thousands more to the possibilities that are theirs in the way of public speaking. The contest deserves the support of every member company executive. From the purely selfish standpoint it will pay big dividends.

Notes on a Golden Day

NEWSPAPER readers everywhere were delighted to read on Oct. 24 that Mr. Edison had reached his New Jersey home in fine spirits and excellent health. As the hero of the most remarkable tribute ever accorded a human being he was bound to have been under a tremendous emotional and physical strain. His ability, at eighty-two years of age, to see through, so graciously and modestly, the program of that exciting day fifty years after his gift of electric light to the world, is in itself as marvelous a thing as any of his world changing inventions.

* * *

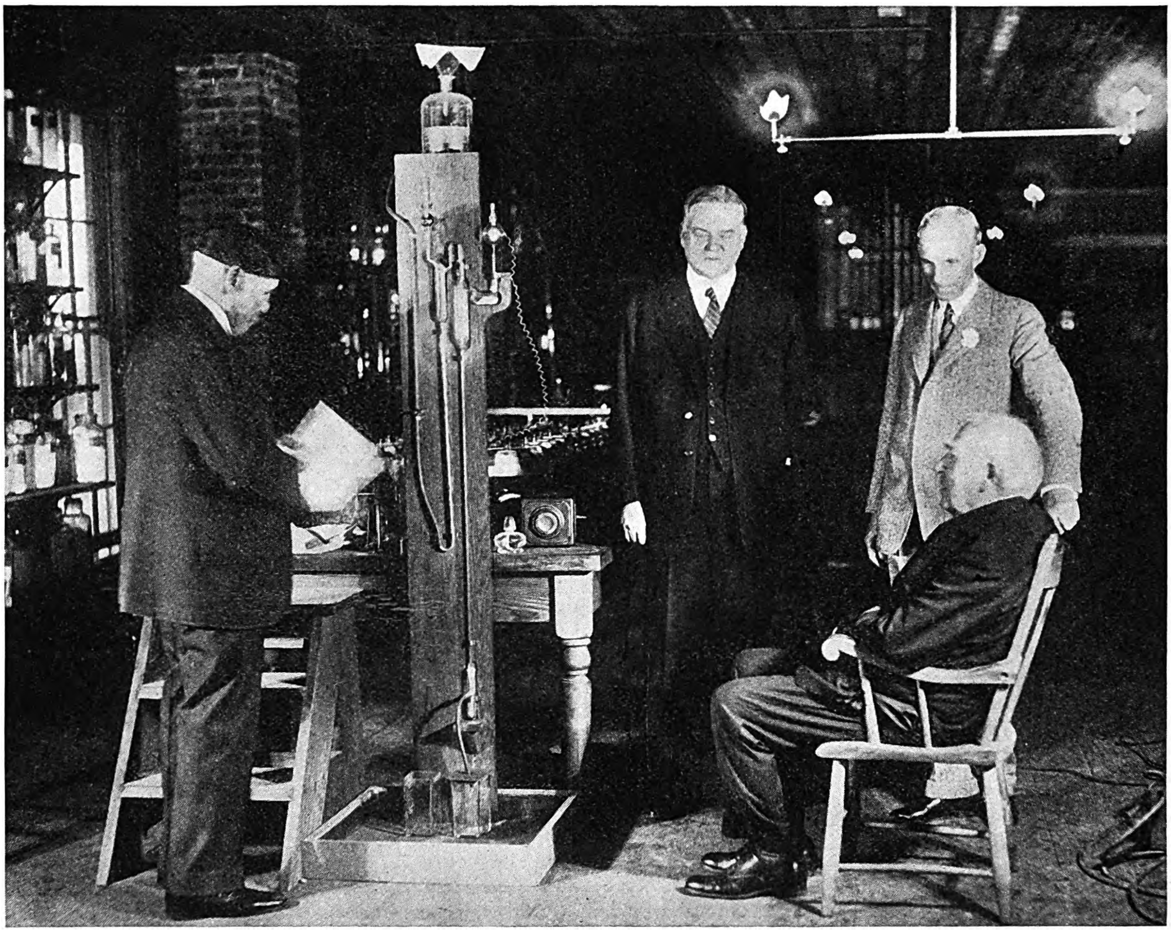
Without doubt every man and woman of the electrical industry felt a very special thrill over the fact that they were participating in one way or another in this splendid gesture of affection and gratitude to the Father of the Industry. Most truly in honoring him, we honored ourselves.

While we of the industry may pardonably feel that the Jubilee had a little more intimate a meaning for us, the rest of the world is not disposed to agree. The celebration was the feature of all the newspapers, scarcely a magazine of any type failed to comment and add its encomium, and the great and the humble of practically all countries joined in praise by telegram, by letter and by word of mouth. But of all of them, Mr. Ford paid the greatest tribute, not necessarily because he was host on Oct. 21, but because of his founding of the Edison Institute of Technology with all that it will mean to the present and to future generations.

Inspired by Edison's greatness, and typical of the urge in countless others, to do homage, the poem by Mrs. Bridewell and the drawing by Miss Greenwood on page 693 of this issue, aside from their intrinsic merits, are interesting because of the fact that the first is by a Louisiana grandmother of seventy years, and the other by a New York maiden of nineteen.

* * *

As might have been expected Will Rogers gave the complete epitome of the party at Dearborn. Remarks Will to Mr. Ford: "When you have been where Otto Kahn and Charles Schwab don't even sit at the speaker's table, *you have been to some banquet.*" And then, as Will bids Mr. Ford goodnight, "I don't want him to think I was being funny either. You see the biggest man in America was sitting there tonight and every one was humble because they knew Edison was a bigger man than they were."



A Historic Moment Recaptured

Francis Jehl, Edison's assistant at the original experiment, President Herbert Hoover, Henry Ford and Thomas Alva Edison at the recreation of the lamp which magically awakened the world to a new brilliance fifty years ago. The wizard of Menlo Park reconstructed the lamp in the same laboratory, now removed to Dearborn, Mich., in which he made his original experiments.

N·E·L·A· BULLETIN

November, 1929 Vol. XVI No. 11

All the World Joins in Tribute to Edison

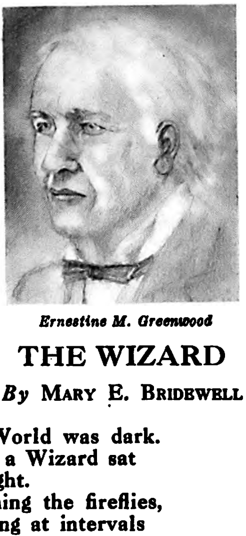
ALL the world knows of the unparalleled tribute to Thomas A. Edison which came to a glorious climax on the night of Oct. 21, and most of the world participated in it. Nevertheless, it is eminently fitting to attempt to give, in these columns, a picture of the most remarkable demonstration of affection and gratitude ever accorded a living man.

The first formal suggestion for the celebration of Light's Golden Jubilee was made at a luncheon of the Edison pioneers of Feb. 11 of this year, Edison's eighty-second birthday. The suggestion was received with the greatest enthusiasm everywhere, and early in June its observance began with the Edison Day program at the 52nd Convention of the N. E. L. A. at Atlantic City. From that time until the party at Dearborn there was a continuous round of local celebrations in all parts of the country.

But all this was but a foretaste of what took place on October 21 at Dearborn, Mich.

Old in years, but youthful in spirit, Mr. Edison relived that historic moment when he, at 32 years of age, yet already famous, produced fifty years ago the first practical incandescent lamp in his laboratory in Menlo Park, N. J. And though he was many hundreds of miles from the Menlo Park of geography, the moment was spent in the same laboratory, on the same sod and amid the same surroundings.

For his friend, Henry Ford, had spent several million dollars that the old laboratory might be restored at the village of Greenfield in Dearborn, with such attention to detail that Edison, as he surveyed it, could express wonder as he found reminder after reminder of the old days.



Ernestine M. Greenwood

THE WIZARD

By Mary E. Bridewell

The World was dark.
Alone a Wizard sat
At night.
Watching the fireflies,
Flashing at intervals
Their weird spontaneous
Light!
Thought's magic, caught
The secret,
Of the firefly's living spark,
And wrought the miracle,
Of instant Light
To dissipate the dark!
Now, every hamlet, every tower,
Flashes far reaching
Beams,
While every land blesses
The Man
Whom God fused with
Miracle schemes!
The summer nights, have
Always flashed,
The firefly's scintillant
Glee,
But Edison alone, could
Vision from its flickering
Spark,
Immediate, World-wide Electricity!

But the comparison with that day back in 1879 ended with the physical surroundings. Then there was no gathering of the world's great men hovering about, no batteries of newspaper men, no gaping crowds.

At this anniversary celebration the President of the United States was there. Leaders in many walks of life, particularly of science, of business and of finance, come to honor the man who had made possible, in many cases, the occupations in which they have won their own successes.

The festivities of the day began with the arrival of President and Mrs. Hoover on a special train at 9.30 in the morning. The presidential party was met at the train by Mr. and Mrs. Ford, Mr. and Mrs. Edison and Mr. and Mrs. Edsel Ford. They boarded a replica of an early Grand Trunk line train and were taken on a jogging, jumpy trip of half an hour to Greenfield. The President and Mrs. Hoover rode in the baggage car where Mr. Edison reenacted the scene that led to his dismissal as a Grand Trunk newsboy and accidentally put him on the trail of the electric bulb.

Mr. Edison published, printed and sold the "Herald," a train paper, from which he made a precarious living, selling fruit and candy and stoking the wood-burning engine between times to help out. He had rigged up a laboratory in one end of the baggage car and everything went well until one day some of his chemicals exploded and set fire to the car. That occurred at Smith's Creek station, near Dearborn. The incensed train crew ejected young Edison and unceremoniously fired him on the spot.

Mr. Edison thereupon took up telegraphy, starting at Smith's Creek station. The train today stopped at the same identical station, which had been moved, brick by brick, to Dearborn by Mr. Ford as part of his early American village. The village is a revival of a typical American settlement of pre-Civil War days.

The Lincoln court house has been removed intact from Lincoln, Ill., where President Abraham Lincoln practised law before his election, to Greenfield. It occupies an important place on the village green. On the other side is the original Clinton Inn, where James Fenimore Cooper, Daniel Webster and other noted travelers, stopped at Clinton, Mich., in 1832. It was the terminus of a day's journey west from Detroit in the old days.

A typical Town Hall stands at the foot of the green facing the village church. One of the oldest structures in the community is the village post-office. It was erected 126 years ago in Phoenixville, Conn., two years after Thomas Jefferson became President. Half post-office, half drug store, this old building has one of the strongest tangs of the past with its echoes of political debates and personal championings of favorite candidates and issues. Doors and wooden shutters are of age-worn planks studded with hand-forged nails.

The Whittier tollhouse and cobbler shop near by, mentioned in Whittier's poems, "The Countess," "The Toll-Man in His Cobbler's Stall," "The Smoking With Closed Eyes." Once it stood on the banks of the Merrimac River beside the bridge that linked Rocksvillage with West Newbury, Mass.

There also was a country store that faced the town of Waterford, a few miles north of Pontiac, from 1854 on. As in the case of the drug store, down at the postoffice, this general store is already equipped with an inventory of goods of every description just as was carried fifty to seventy-five years ago.

The railroad station is at the end of a winding road running at right angles from the village green.

Outside the station, on the track, steam up and ready to go, was the wood-burning locomotive, its bell-shaped smokestack chugging, behind it three cars of antique design. This engine came of a notable family. It is a sister locomotive of the famous "General" which was captured from Union troops by Southern forces during the War of the States.

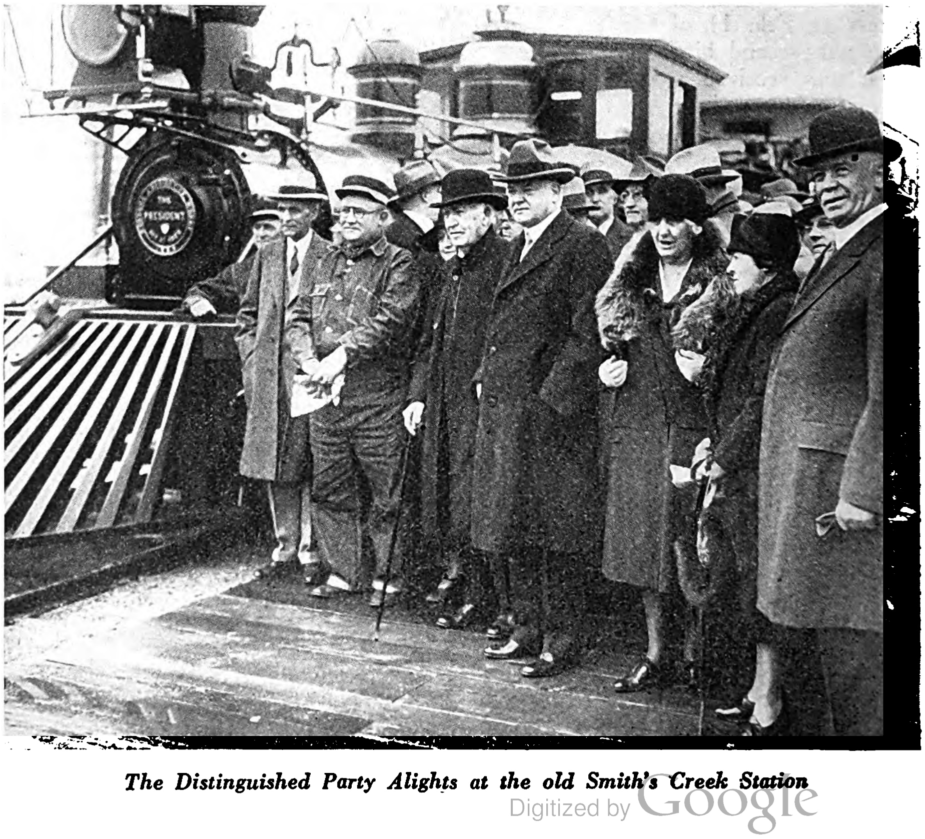
Mr. Ford, when he was a boy, knew an engineer named Sam Hill, who drove on the Michigan Central through Dearborn. His speed proclivities gave rise to the expression, "He goes like Sam Hill." Records of Hill's employment and death are in the Ford files. So the old locomotive become the "Sam Hill."

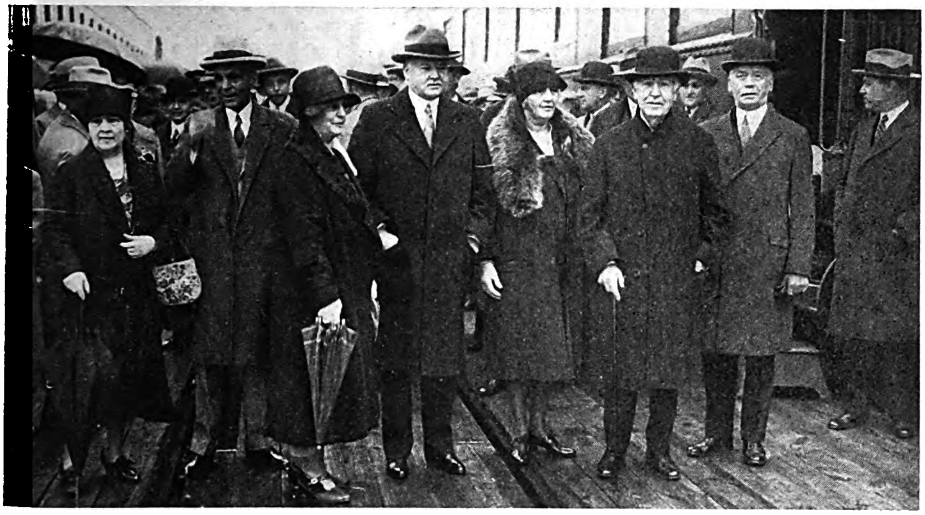
In other parts of the village stand the actual village blacksmith shop, a carding mill, a grist mill of the date of 1816 and a sawmill of the same date; a village machine shop, a livery stable filled with carriages of all types and ages; a typical log house of Michigan pioneer days and several actual dwelling houses, all removed from their original settings to take their places as living quarters for those who will study and find employment in this most unique of communities.

In this little village, now called Greenfield, which will become part of the laboratory of the Edison Institute of Technology, there gathered the 500 guests of Mr. Ford, come to pay tribute to the grand old man of electricity.

The day of tribute to Mr. Edison will never be forgotten by any who were privileged to be present. On the lower floor of "Independence Hall" (an enlarged reproduction of Independence Hall in Philadelphia), which is to form the central museum of the Edison Institute, the guests of Mr. Ford sat down to dinner to the strains of the early American orchestra. At 7.30 p. m. Mr. Edison, President Hoover, Mr. Ford, Owen D. Young and a small party left the hall and drove to the laboratory building and there re-enacted the lighting of the lamp. Here Francis Jehl, playing his part of fifty years ago, was occupied as he was then in operating the mercury pump to evacuate the lamp under test. Mr. Edison entered and tried the lamp with battery current. It flashed for only an instant before he broke the circuit and told Mr. Jehl that the vacuum was not yet good enough. Finally the bulb was satisfactorily evacuated, and Mr. Edison prepared to give in the final test of operation with current from a dynamo. He left the laboratory and went over to the machine shop in a neighboring building where the generators are installed. Steam was ready in the original Babcock & Wilcox wood-fired boiler. The nine bipolar dynamos driven by belts coming up through the floor from line shafting below began to spin as Mr. Edison opened the throttle on the single-expansion Brown engine, which is a replica, as the original could not be found. Then the party returned to the laboratory, where Mr. Jehl had sealed off the bulb. Mr. Edison made the connections. The lamp burned—a bright symbol of accomplishment illuminating the faces of the aged inventor and his co-worker as it did half a hundred years ago, when it was only a symbol of hope and those same faces were youthful and unlined.

Every step in the ceremony was described by Graham McNamee over the radio to those at the banquet and to the countless unseen audience that listened in on this eventful night. Suddenly, as Mr. Edison connected the old battery to the lamp, the rich glow of hidden electric floodlights sprang into life in the great candle-lit corridors of Independ-


The Distinguished Party Alights at the old Smith's Creek Station



On the Platform of the Station

ence Hall, and a thrill ran through the assembly as the "Liberty Bell" in the tower began to ring glad news that history had been remade.

At the conclusion of the re-enactment of the historic scene the party returned to Independence Hall, where Owen D. Young, acting as toastmaster, introduced W. S. Barstow, president of the Edison Pioneers; Mr. Ford, Mr. Edison and Albert Einstein (over the radio from Germany) for short addresses. Mr. Owen D. Young, speaking as toastmaster, then said:

> "Mr. Edison, to express what is in the hearts and minds of all who hear my voice, my first word must be not one of appreciation of your great inventions or of the service which they have rendered, but rather one of congratulation on that vitality of spirit which makes you do what you do. You come to Greenfield Village today, adventuresome still, as if life lay all ahead of you and none behind. To be sure, the passengers on your railway train took a little more notice of you than they did seventy years ago when you tried to sell them papers. The greeting at Smith's Creek depot was a little warmer than on that memorable day in 1861, when the railroad people dispensed with your services because you set fire to their cars with this same vitality of which I speak, aided by a little phosphorus.
>
> "That was a great day for the electrical industry; one might say that that industry was largely born at Smith's Creek depot. The same unconquerable will and unquenchable fire which took you out of that depot and set you on your career brings you back to it today, defying the years that have since gone by. It was that vitality of spirit which forced your head to conceive and your hands to execute, which defied sleep as you now defy age. But it did not work alone on your mind and body, and that, I suspect, is the secret of your great success. It worked on and through your heart, and that I know is the secret of this meeting today. Your head and your body, driven to their utmost, could not alone have stood the strain. It needed one thing more, and that you had—a vital sympathy with and generosity toward men—your own assistants and associates. This drew around you at Menlo Park a group of young men, voluntarily worshipping at your shrine, now known as Edison Pioneers, but who might be known as the apostles of the electrical industry—attracted and held by your enthusiasm, coupled with all the things which make one man serve another.
>
> "As you grew older and projected that vitality in other fields, great leaders and millions of men, women and children have been attracted by it. All seek to do you honor. The President of the United States is here. Millions of people, not alone in your own country but in others, celebrate with you tonight on the radio, and without your lamp as a forerunner the radio would have been impossible. Most conspicuous of the many is our host, Mr. Henry Ford. He has built the Edison Institute of Technology and Industrial Museum in your honor. Other men could have built an institute, but Mr. Ford has done something more."

In concluding his address Mr. Young read greetings and felicitations to Mr. Edison from the Prince of Wales, President von Hindenburg of Germany, as from one octogenarian to another, and from Commander Byrd in Little America in the Antarctic. Mr. Ford was then introduced and bowed his acknowledgments.

The final address was given by Herbert Hoover, President of the United States, from the brilliantly lighted balcony of the Menlo Park laboratory office. He spoke to two purposes, in appreciation of Thomas Edison's accomplishments in the service of civilization and humanity and in dedication of the Edison Institute of Technology.

Throughout the speaking the guests were conscious of the detonations of fireworks and the recurring drum ot airplanes participating in a great gala display of illumination outside Independence Hall, bearing testimony to the wonders of this gift of light for which the wizard of Menlo Park has placed the world in debt. The touching words of Mr. Young, the great tribute paid by the President of the United States, the presence of Madame Curie, come from France to add her reverent testimonial to the honor of this man of science were pallid beside the words of Mr. Edison himself. He arose trembling with emotion, and expressed his grateful appreciation in these simple words:

"I am told that tonight my voice will reach out to the four corners of the world. It is an unusual opportunity for me to express my deep appreciation and thanks to you all for the countless evidences of your good will. I thank you from the bottom of my heart.

"I would be embarrassed at the honors that are being heaped upon me on this unforgettable night were it not for the fact that in honoring me you are also honoring that vast army of thinkers and workers of the past, and those who are carrying on, without whom my work would have gone for nothing.

"If I have spurred men to greater efforts and if our work has widened the horizon of man's understanding even a little and given a measure of happiness in the world, I am content.

"This experience makes me realize as never before that Americans are sentimental, and this crowning event of Light's Golden Jubilee fills me with gratitude. I thank our President and you all.

"As to Henry Ford, words are inadequate to express my feelings. I can only say to you that, in the fullest and richest meaning of the term, he is my friend.

"Good night."

Crowd at Dearborn Waiting in the Rain to See the President and Mr. Edison

The President's Address at the Edison Celebration

By HERBERT HOOVER

President of the United States of America

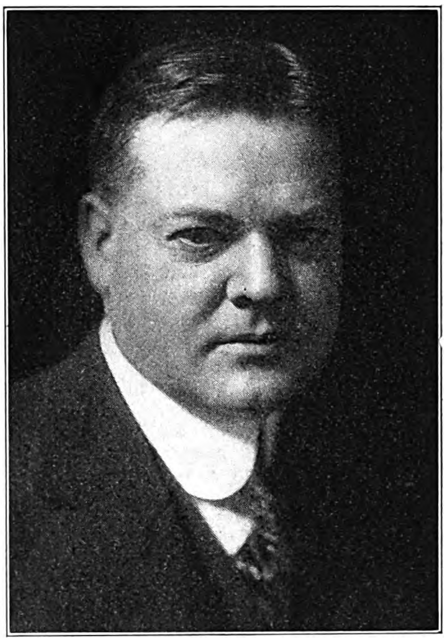
FELLOW COUNTRYMEN AND WOMEN:

This ceremony is a part of the celebration of Mr. Edison's invention of the electric lamp. It is also the dedication of the Edison Institute of Technology, the gift of Mr. Ford. Both are, in fact, national tributes to Mr. Edison.

The multiplication of the amount of light in the world a thousandfold is worthy of celebration, for darkness is a forbidden limitation upon righteous human activities.

When Mr. Edison invented the electric lamp he may perhaps have thought just to produce plain light and more of it at less cost. I surmise that his wildest ambition was to relieve the human race from the curse of always cleaning oil lamps, scrubbing up candle drips, and everlastingly carrying one or the other of them about. He may have thought to add safety to Chicago against a second accident from an oil lamp. But the electric lamp has found infinite variety of unexpected uses. It enables us to postpone our spectacles for a few years longer; it has made reading in bed infinitely more comfortable; by merely pushing a button we have introduced the element of surprise in dealing with burglars; the goblins that lived in dark corners and under the bed have now been driven to the outdoors; evil deeds which inhabit the dark have been driven back into the farthest retreats of the night; it enables the doctor to peer into the recesses of our insides; it substitutes for the hot-water bottle in aches and pains; it enables our cities and towns to clothe themselves in gayety by night, no matter how sad their appearance may be by day. And by all its multiple uses it has lengthened the hours of our active lives, decreased our fears, replaced the dark with good cheer, increased our safety, decreased our toil, and enabled us to read the type in the telephone book. It has become the friend of man and child.

In making this, as in his other great inventions, Mr. Edison gave an outstanding illustration of the value of the modern method and system of invention, by which highly equipped, definitely organized laboratory research transforms the raw material of scientific knowledge into new tools for the hand of man.



PRESIDENT HOOVER

In earlier times mechanical invention had been the infrequent and haphazard product of genius in the woodshed. But science had become too sophisticated a being to be wooed in such surroundings. Nowadays a thousand applied science laboratories, supported by industries of our country, yearly produce a host of new inventions.

I can perhaps illustrate this modern method of invention. The fundamental natural laws of electricity were discovered three-quarters of a century ago by Faraday, Hertz, Maxwell and other great investigators in the realms of pure physics and mathematics. Faraday discovered that energy could be transformed into electricity through induction —the theory of the electrical generator. It was one of the momentous discoveries of history. It is related that Mr. Gladstone was induced to visit Faraday's laboratory to see this new scientific contraption. When Gladstone is said to have made the characteristic practical man's inquiry, "Will this ever be of use to mankind?" Faraday replied, "Some day you will collect taxes from it."

Mr. Edison, using organized systematic laboratory research, has been one of the great leaders who have converted the pure physics of electricity into a taxable product. Today the Governments of the world levy upon upward of $60,000,000,000 of new wealth founded upon electricity.

But the taxes and new wealth are not the major accomplishments of the men of this genius. These are the rivers of sweat saved from the backs of men and the infinite drudgery relieved from the hands of women.

I may emphasize that both scientific discovery and its practical application are the products of long and arduous research. Discovery and invention do not spring full grown from the brains of men. The labor of a host of men, great laboratories, long, patient, scientific experiment, build up the structure of knowledge, not stone by stone, but particle by particle. This adding of fact to fact some day brings forth a revolutionary discovery, an illuminating hypothesis, a great generalization, or a practical invention.

Research both in pure science and in its application to the arts is one of the most potent impulses to progress. For it is organized research that gives daily improvement in machines and processes, in methods of agriculture, in the protection of health, and in understanding. From these we gain constantly in better standards of living, more stability of employment, lessened toil, lengthened human life, and decreased suffering. In the end our leisure expands, our interest in life enlarges, our vision stretches. There is more joy in life.

It is the increasing productivity of men's labor through the tools given us by science that shattered the gloomy prophecies of Malthus. More than a century ago that great student held that increasing population would outrun the food supply and starvation was to be the inevitable executioner of the overcrowded earth.

But since his day we have seen the paradox of the growth of population far beyond anything of which he ever dreamed, coupled at the same time with constantly increasing standards of living and ever increasing surplus of food. Malthus was right except for a new contestant in the race with his principle: that was more scientific research, more discovery. And that race is still on. If we would have our country improve its standards of living and at the same time accommodate itself to increasing population we must maintain on an even more liberal scale than ever before our great laboratories of both pure and applied science.

Our scientists and inventors are among our most priceless national possessions. There is no sum that the world could not afford to pay these men who have that originality of mind, that devotion and industry to carry scientific thought forward in steps and strides until it spreads to the comfort of every home; not by all the profits of all the banks in the world can we measure the contribution which these men make to our progress. And they are the least interested in the monetary results. Their satisfactions are in their accomplishment—in the contribution of some atom of knowledge which will become part of the great mechanism of progress. Their discoveries are not the material for headlines. Their names are usually known but to a few. But the Nation owes them a great honor and is proud to demonstrate through Mr. Edison today that their efforts are not unappreciated. The country can well pay its tribute to the men of this genius by expanding the facilities for their labors. The Nation today needs more support to research. It needs still more laboratories. To that Mr. Ford is making a generous contribution.

And in establishing this institute, Mr. Ford is doing honor to Mr. Edison in a manner which appeals to a sense of fitness—that is, by founding an institution dedicated to education and scientific research.

And scientific research means more than its practical results in increased living comfort. The future of our Nation is not merely a question of the development of our industries, of reducing the cost of living, of multiplying our harvests, or of larger leisure. We must constantly strengthen the fibre of national life by the inculcation of that veracity of thought which springs from the search for truth. From its pursuit we shall discover the unfolding of beauty, we shall stimulate the aspiration for knowledge, we shall ever widen human understanding.

Mr. Edison has given a long life to such service. Every American owes a debt to him. It is not alone a debt for great benefactions he has brought to mankind, but also a debt for the honor he has brought to our country. Mr. Edison by his own genius and effort rose from modest beginnings to membership among the leaders of men. His life gives renewed confidence that our institutions hold open the door of opportunity to all those who would enter.

Our civilization is much like a garden. It is to be appraised by the quality of its bloom. In degree as we fertilize its soil with liberty, as we maintain diligence in cultivation and guardianship against destructive forces, do we then produce those blossoms, the fragrance of whose lives stimulates renewed endeavor, gives to us the courage to renewed effort and confidence of the future.

Mr. Edison's Message to the World

Through the courtesy of the General Electric Company, a special short wave broadcast at 5 p.m. on Oct. 21 from Dearborn, Mich., carried Thomas A. Edison's message to the world. This necessitated a leased wire from the old laboratory at Dearborn direct to the short wave transmitters of the General Electric Company at Schenectady. The arrangement was made by Mr. Henry Ford and Mr. J. F. Quinlan, Executive Secretary of Light's Golden Jubilee.

Mr. Edison's message was read by Mr. E. Wilbur Rice, Jr., Honorary Chairman of the General Electric Company, as Mr. Edison was not in a position to read it in person. Mr. Rice was introduced by Mr. Quinlan. Mr. Edison's message was as follows:

THE contribution to the growth of the electric light and power industry has been truly international. We are celebrating today, the world over, fifty years of wonderful progress, including contributions from practically every country.

It gives me great satisfaction to extend, personally, greetings to my coworkers in every country of the Eastern Hemisphere on this occasion of Light's Golden Jubilee.

I wish that I could talk personally to Italy, France, Germany, England, Australia, and every other country but, as this is not possible, please accept these general remarks addressed to you all as my personal appreciation of your interest in this celebration and of the contributions made by you all to the raising of life's standards.

Now, to our neighbors in the great Latin American countries at the South, I wish to express my appreciation for your interest in Light's Golden Jubilee. We are growing closer and closer to each other as the years pass by and we all realize, I think, that electricity is playing an important part in this closer union of thoughts and ideals.

I wish it were possible for me to visit the many romantic places in your countries and to meet your distinguished citizens who have contributed so much culturally as well as industrially to the development of the Western Hemisphere and of the world. But at least I have the pleasure, and I am glad I have the privilege, to extend to you all, on the occasion of Light's Golden Jubilee, my heartiest greetings.

To my fellow-countryman, Commander Byrd, 'way down near the South Pole, and to the brave adventurers with him, I send my greetings. I know that the light of high purpose and brave resolve in the interest of scientific achievement has burned brightly for you through the long night; and I am glad that I have this opportunity of sending you my hearty wishes for a distinguished success.

Prof. Einstein's Message to Mr. Edison

New history was made on the night of the Edison celebration, Oct. 21, when Prof. Albert Einstein's tribute to Mr. Edison was broadcast from Berlin, Germany, across the Atlantic to Dearborn, Mich., and then rebroadcast throughout the country. This was the first occasion when all radio listeners in the United States could hear the voice of one speaking from so distant a place as Berlin. The transmission from Berlin was over the standard long-wave system of the American Telephone & Telegraph Company.

The message of Professor Einstein, translated into English, was as follows:

"MY Dear Mr. Edison: It affords me an unusual pleasure to be permitted to send you my greetings from this most distant point. The intellectual workers everywhere, especially physicists and technicians, today address their thoughts to you and your achievements in a spirit of admiration and devout sympathy.

"You have been equally successful as pioneer, as developer and as organizer. Your construction of the incandescent lamp has made possible the development of a mighty electrical industry.

"The technical geniuses of the world, of whom you are one of the most successful, have confronted mankind with a new situation in the course of the past half century—a situation to which it has not yet succeeded in adapting itself.

"Today man no longer requires the use of his muscles to obtain those commodities necessary for the maintenance of life. He no longer needs to function as a motor or a slave.

"The creative geniuses of coming generations in all probability will be the leaders of men whose duty it shall be to divert the resources of technique from the purposes of war into the service of economic welfare and the liberation of mankind."

An Outstanding Event in Radio History

By M. H. Aylesworth

President, National Broadcasting Company

FIVE hundred men and women sat in a banquet hall at Dearborn, Mich., last month and heard distinguished Americans pay tribute to Thomas Alva Edison.

A scant half dozen witnessed reenactment of the construction of the first incandescent electric light, in a little laboratory like the one in which Mr. Edison perfected that invention.

Fifty millions of persons in the United States, and unknown numbers in virtually every other country in the civilized world heard the voices of President Hoover, Owen D. Young, William S. Barstow and Mr. Edison himself, from the banquet hall. They also received a first hand description of the events in the laboratory from Graham McNamee, Phillips Carlin and William Lynch, National Broadcasting Company observers, and heard the voice of Albert Einstein, coming over the thousands of miles of space from Berlin.

Thus through the microphone, direct descendant of one of Mr. Edison's earlier inventions, were carried to the world the messages of tribute to the wizard of electricity.

The program comprised one of the outstanding events in radio history. In an event with so many important persons concerned, and with such a serious subject, it could well have been expected that the radio broadcast would be interesting, but not necessarily thrilling.

As a matter of fact, there was something deeply and touchingly human about the entire affair. The opening remarks of Mr. Young, in which he referred to the early days of Mr. Edison. while thoroughly dignified, instantly gladdened the heart of the radio listener, and made him feel the human-ness of the man Edison, dispelling the idea of the man-machine, grinding out mechanical contrivances in a mechanical way. Mr. Barstow, one of Edison's old associates, did much to carry on that atmosphere.

President Hoover's address was a masterpiece of understanding. His touches of swift-moving humor, his intimate treatment of his theme, served to emphasize the human side, not only of Mr. Edison, but of himself as well.

Mr. Edison himself, as he rose to reply to the tributes showered upon him, was visibly affected, and the emotion was apparent in the voice that went over the radio. On the verge of a collapse, his stout heart carried him on to the end of a day that had been filled with nervous and physical strain. It was an inspiring sight to those present to see the white haired veteran standing before the microphone, speaking to the world, but it is doubtful that they received a greater thrill than the millions of listeners who heard his voice in their own homes through the instrumentality of the radio.

The broadcast required a considerable amount of preparation by program directors and engineers. National Broadcasting Company workers spent months in cooperation with the Jubilee Committee, making detailed arrangements. We believe that the time and expenditure has been more than justified by the results, as manifested in messages of appreciation from listeners in all parts of the world.

Mr. Arkwright's Address at Port Huron

Among the thousands of Light's Golden Jubilee Addresses was one of particular interest made by P. S. Arkwright, past-President of the National Electric Light Association, at Port Huron, Mich., where Edison resided in the newsboy era of his career, and where also Mr. Arkwright first began his work in the electric light and power industry. Mr. Arkwright made the address at the unveiling of a boulder and plaque commemorative of Mr. Edison. He said in part:

INDIVIDUAL initiative, spurred by faith, imagination and persistency, brought success not only to Mr. Edison, but have proven the driving forces which have made the electric industry the great servant that it is to all mankind. Without that individual initiative; without that personal sacrifice and enterprise which goes hand in hand with private ownership, the electric industry would never have reached its great stage of usefulness.

We of the electric industry realize that although our achievements of the past have been great, the future holds even greater opportunities for us to serve. We fully sense our responsibilities—and if given the opportunity, we pledge ourselves to carry on for greater service to all the people the industry launched by the benefactor we honor here. The future holds greater home electrification—greater motorization of industry — better working conditions and a higher living standard for labor —greater and more electrification of the farm—and faster and safer transportation by electrification of the steam railroads and the development of night aviation.

Mr. Edison with his more than one thousand inventions has done much for humanity. His many inventions, commercially speaking, have gathered together capital totaling billions of dollars. But to me more important is, that his life has exemplified to the youth of the world what can be accomplished where there is a will to do—coupled with imagination, zeal and persistency. His works, his life, his living habits have proven an inspiration, have spurred on many to high and important endeavors, and have helped give to America the preeminent position that it holds in the world today.

No words that I can speak can better describe what I mean than those few words that came from Calvin Coolidge, when as President of the United States he pinned upon Mr. Edison's lapel the Congressional Medal of Honor:

"Noble, kindly servant of the United States, and benefactor of mankind, may you long be spared to continue your work and to inspire those who will carry forward your torch."

What Happened at Menlo Park, N. J., October 21, 1929

By FRANK A. WARDLAW

Secretary, Edison Pioneers

The "Eternal Light"

placed on concrete pedestal with bronze door on which is quotation from R. R. Bowker. It rests on actual center of site of original laboratory. The lamp in glass case is without filament and is illuminated by rays from lamps and reflectors within the hollow concrete base deflected through the eternal lamp neck. Electric lamps are supplied with current from Public Service lines and storage batteries.

THE day and evening were of ideal autumnal weather—not a drop of rain nor an unpleasant incident to mar the picture. Though but a few days had been at our disposal, the untiring efforts of H. A. Campbell, with the cordial cooperation of the Edison Lamp Works and the Public Service Gas & Electric Corporation of New Jersey, saw Menlo Park transformed from its usual lethargy into one of brilliance and animation.

Among the guests present at Menlo Park in the evening were Mr. Edison's children, Mrs. Marion Edison Oser, Thomas A. Edison, Jr., and William Leslie Edison, who remained throughout the entire celebration.

The presiding officer was W. S. Mallory; the speakers were former Governor George Silzer, former U. S. Senator Joseph Frelinghuysen and former U. S. Commissioner John A. Matthews.

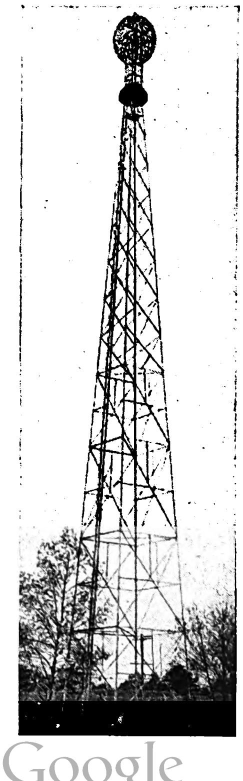
The band of the New York Edison Company had graciously tendered its services, and provided excellent music throughout the evening, a covered band stand having been built for its use. The band's services were secured through Mr. Campbell.

By seven-thirty in the evening, when the broadcasting commenced from Dearborn, an audience of some two or three thousand people had assembled in front of the speakers' stand, or remained in their cars. The broadcasting from Dearborn was exceptionally clear, a direct wire having been arranged for this purpose. At the conclusion of the Dearborn ceremonies, Mr. Mallory made a short but excellent address, reading among other things the telegram sent by John W. Lieb to the assembled pioneers, the three cheers and salute which he requested being enthusiastically given, U. S. Commissioner Matthews acting as cheer leader. It did one's heart good to hear the surrounding hills echo these cheers that for the time at least brought dear old Menlo Park to the "place in the sun" it once occupied. Former Governor Silzer was then introduced and, at the conclusion of his well-chosen remarks, was followed by former Senator Frelinghuysen, and he in turn by Commissioner Matthews, all of whom gave excellent addresses. Mr. Mallory then read a splendidly worded poem written by R. R. Bowker, and regretted Mr. Bowker's inability to be present, owing to Mrs. Bowker's indisposition.

Prior to the Menlo Park ceremonies, a telegram expressing the congratulations and affection of the Edison Pioneers assembled at Menlo Park was sent to Mr. Edison at Dearborn. The celebration closed at ten o'clock.

Many Edison Pioneers were present, all classes of membership being represented. Among these loyal adherents of Menlo Park was Edward Dean Adams, Messrs. Benton, Kreusi, Nesmith, Rowland, Estabrook, Melick, Campbell, Westerdahl, Bogart, Moore, Miller, Hickman, Mallory, McLean, Simmen, Baker, Dempster, Stebbins,

(*Continued on page* 756)



Group Taken at Menlo Park, N. J., Celebration

Included in the group are Mrs. Thomas A. Edison, Jr., Thomas A. Edison, Jr., Mrs. Marion Edison Oser, William L. Edison, Mrs. William L. Edison, C. E. Estabrook, Walter Kruesi, Edward Deane Adams and F. A. Wardlaw.
At right is the steel tower, 120 feet high surmounted by huge lamp (with base 15 feet high) made of steel frame work and carrying about 960 incandescent lamps, under which is the "Eternal Light," first lighted the evening of October 21 by Mr. Edison. The tower is lighted every night from dark to dawn and may be seen for miles.

Trip to Europe Offered as Prize in Employees' Speaking Contest

A TOUR of Europe during the summer of 1930, with all expenses paid, a second prize of $500 in cash and a third prize of $250 are the awards offered to the winners of the National Employees' Speaking Contest, initiated by the Public Speaking Committee of the Public Relations Section, N.E.L.A., and sponsored by the Association.

Thousands of employees representing practically all of the Class A member companies of the N.E.L.A. are expected to take part in the contest which will be conducted progressively. The preliminary elimination contests will be held first within member companies; second, between member companies within the State; third, between States within the Geographic Divisions, and finally between the Geographic Division winners. The winners of the National Contest will be announced at the 53rd Convention of the Association at San Francisco in June of next year.

The object of the contest is to increase interest in, and to promote a better understanding of the importance, benefits and practicability of public speaking activities throughout the industry.

The rules of the contest have been published in a booklet by the Association, copies of which may be secured free upon request to the National Electric Light Association, 420 Lexington Avenue, New York.

Any employee of a Class "A" member company of the N.E.L.A., except officers, managers and general office department heads, is eligible to talk on the selected subject, "The Electric Utilities' Contribution to My Community, State and Nation." The terms "officers," "managers," and "general office department heads" are subject to varying interpretations. There is no thought in the minds of the National Committee of excluding the small-town managers or superintendents. The contest is intended to attract the rank and file of the electric light and power industry rather than the managerial group. Subject to the foregoing, the question of eligibility will be in the hands of each State Committee, whose judgment shall be final.

The delivery of this talk must not consume less than 10 or more than 15 minutes. The treatment of the subject should combine historical background with application of conditions today; that is, what were the conditions prior to the advent of the use of electricity and what are they today; what has been the social and economic effect of electric utility development on individuals, home, place and business, and industry. Much available information can be secured through study of "Electric Light and Power Industry in the United States," files of the N.E.L.A. BULLETIN, *Electrical World, Electric Light and Power, Public Service Magazine, Forbes Magazine,* Geographic Division and member company publications, and many other sources.

Contests will be conducted progressively.

1. Within the member companies.
2. Member companies within the State.
3. States within the Geographic Division.
4. And final, between the Geographic Divisions.

Procedure

Member Companies

In conformity with the specified rules and regulations, it is recommended that each Class "A" member company of the N.E.L.A. arrange to have an elimination contest.

States

The winners for each Class "A" member company within a State shall compete in the elimination contest for the State at such time and place as may be designated by the State Committee.

Geographic Divisions

The winners for each State within the Geographic Division shall compete in the elimination contest for the Geographic Division at such time and place as may be designated by the Geographic Division Committee.

Final Contest

The winner for each of the Geographic Divisions shall compete in the Final Contest at such time and place as may be designated by the National Committee.

It is recommended that the chief executive of each Class "A" member company appoint a committee of three to sponsor and make all necessary arrangements for the contest.

In States where there exists an association representing the interests of the electric light and power industry, it is recommended that the executive officer of such association appoint a committee of three to plan for the State, the executive officer of such State association to be a member of this committee. In States where no association representing the interests of the electric light and power industry exists, the secretary of the Geographic Division in which the State is located will make arrangements for appointment of a State committee.

It is recommended that the president of each N.E.L.A. Geographic Division appoint a committee of three to make all arrangements for the elimination contest within that division, the secretary of the Geographic Division to be a member of this committee.

The National Committee has been appointed and will make all arrangements for the completion of the contest and see that winners receive their prizes.

The first prize in the National Contest will be a tour of Europe during the summer of 1930, with all expenses, exclusive of purely personal items, paid from the winner's residence to port of embarkation to Europe and return to home city. The trip to be made in company and under the guidance of some reputable tour company, with the purpose in mind of having the winner not only see the various points of interest, but to learn something of value relative to the electric light and power industry in Europe. This would call for visiting one or more of the principal power companies, where arrangements will have been made for visits to power plants, offices, etc.

The winner will be required to obtain his or her own passport and to send it to the National Electric Light Association. All details of the tour (including visas of passports) will be taken care of at no expense to the winner.

The second prize will be $500.

The third prize will be $250.

Each company, each State and each Geographic Division is responsible for all expense for judges, for prizes and for traveling within the company, the State or the Geographic Division, respectively.

The order in which contestants shall deliver their address will be determined by drawing for position immediately before contest.

All addresses shall be judged equally on composition and delivery. In judging composition, the judges will consider grasp of the subject, arrangement of material, and the constructive character of ideas. In delivery, the judges will consider clarity, force of expression and general platform decorum.

Be Damned if You Do and Be Damned if You Don't

By AMPLIFIER

IT so happened that in the days of ancient Greece a young Athenian desired to become a lawyer. Going to a teacher of the law he said: "Teach me the law and after I have become proficient and have won my first case in the courts I will pay you twenty-five hundred drachmas."

To this the teacher agreed, but after his studies were completed the young man's interest in the law waned and he concluded that he did not wish to become a lawyer. The teacher sued him for breach of contract and demanded judgment in the sum of twenty-five hundred drachmas. The young student elected to defend himself in the courts, his defense being that he had agreed to pay the twenty-five hundred drachmas only after he had won a case before the courts.

He thereupon found himself in this predicament: If he defended himself successfully, he would have won his first case, and the twenty-five hundred drachmas would be immediately due under the law. If he lost the case, the courts would give his teacher judgment in the sum of twenty-five hundred drachmas. Either way he must lose.

The moral of this story might very easily be that a man who is his own lawyer has a fool for a client. That, however, is not the point I wish to make. The young man's situation was analogous to the situation in which many great public services, and, in fact, a great many other national industries, find themselves today: no matter what they may elect to do, it is a case of "be damned if you do and be damned if you don't."

THE most outstanding example of situations of this kind has to do with the whole question of publicity, which those who insist that our whole economic system of production and distribution is all wrong persist in calling "propaganda," emphasizing the word in such a way as to insinuate that it is some sort of criminal practice.

The dictionary tells us that propaganda is "an effort directed systematically toward the gaining of public support for an opinion or a course of action." If this is a correct definition, and I believe it is, then every candidate for office who endeavors to gain public support of his candidacy, every public official seeking indorsement of his policies and actions, every editorial writer, every public speaker, every manufacturer or business man seeking public favor for his wares, is a propagandist. Every chamber of commerce, citizens' association, parent-teachers' organization, farm or industrial organization, labor union, pacifist or national defense advocate, minister or social worker, college professor or public school teacher, indulges systematically in propaganda. To insist that the word is in disrepute is to insist that many of the acts of a majority of our most intelligent citizens are disreputable.

IN the old days, the critics of large business enterprises based their most severe criticisms on the alleged secrecy with which the executives of these enterprises surrounded their operations. They claimed that the public had a right to know what they were doing, how they were financing themselves, what profits they were making, and so on and so forth. The result was legislation that makes it possible for any citizen who may be interested to find out almost as much about any business as the president or chairman of the board of directors of that business. Some of this legislation was good and has worked in the interests of the public; some of it was bad and has worked against the interests of both the public and industry.

Then American business decided on a new course of action. It decided that instead of trying its case before legislative committees engaged in considering proposed laws which affected it, it would try its case in the court of public opinion, acting as its own lawyer, or engaging public relations or publicity experts to act for it. This policy was soon generally adopted, and today practically every industry of size in the country has its publicity department. The balance sheets, statements of profit and loss, accomplishments and financial problems are all placed in evidence before the High Court of American Public Opinion.

This policy, however, has been upsetting to the socialistically inclined, who almost invariably demand *ex parte* hearings, whether before Congressional Committees or the public at large. They do not believe in courts, where defense is possible. They desire to be judge, jury, prosecuting witness and executioner, and, just as they once damned business for alleged secrecy, they now damn it for its policy of disseminating information concerning itself, and seek judgment against it from the public.

No industry has been subject to greater criticism of this kind than the light and power industry. Some years ago it embarked on a policy of telling the public everything there was to know about its business, circumstances at that time making such action almost imperative.

In 1919, the public utility industry of the country generally was in great difficulties. Labor, material and other operating costs had been doubled and trebled. Rates remained stationary at, or near, pre-war levels; increases were difficult to secure from regulating authorities. Earnings were, in consequence, adversely affected; often disastrously. Utility development was all but stopped. The war had interrupted plant and equipment construction, and this deficiency, plus the additional plant and equipment needed for new service demands, could not be supplied without new capital. The new capital could be obtained on suitable terms only in competition with other industrial borrowers, by restoring credit, and rewinning investor confidence on a basis of fair rate readjustments.

MOST companies in all branches of the utility industry—gas, electric, telephone, electric railways, etc.—were crippled. Some were being strangled. By March 15, 1919, upwards of 70 street railway systems were in receiverships and many others were near it. The street railway situation reacted upon all other utilities, correspondingly increasing their difficulties, and the general utility situation was, consequently, disturbing the entire financial and economic structure of the country.

In order to understand the gravity of the situation it is necessary to go back about a year. On February 15, 1918, the Secretary of the Treasury wrote the President as follows:

"Dear Mr. President: I beg to hand you herewith several memoranda and letters relating to street railway and other local public utilities furnishing light, heat and power, which I have been asked to bring to your attention by a committee representing public utility interests.

"These papers indicate the existence of genuine apprehension regarding the adequacy, under present conditions, of the services and rates of local public utilities. The view is expressed that increased wages and the high cost of essential materials and supplies have affected them as they have affected everybody else, and that united effort will be necessary in order to meet alike the public requirements for service and the corporate financial needs upon which that service depends. . . .

"Our public service utilities are closely connected with and are an essential part of our preparations for and successful prosecution of the war, and the unfavorable tendencies which the accompanying papers reveal may most effectively be checked, wherever they may be found to exist, and the needed relief obtained, only by prompt action on the part of the respective local authorities. . . . "

To which President Wilson replied on February 19, 1918, as follows: "I have examined with care the memoranda and letters which you transmitted to me with your letter of the fifteenth. I fully share the views you express regarding the importance of the public service utilities as a part of our national equipment, especially in war time. It is essential that these utilities should be maintained at their maximum efficiency and that everything reasonably possible should be done with that end in view. I hope that State and local authorities, where they have not already done so, will, when the facts are properly laid before them, respond promptly to the necessities of the situation.

"I shall be glad to have you communicate with the local authorities whenever the information in your possession suggests that such a course is desirable and in the national interests."

BY May, 1919, the situation had become so serious that the cabinet took the matter up and decided to communicate with the President, who was in Paris attending the Peace Conference. On May 15, Secretary of Commerce Redfield and Secretary of Labor Wilson addressed a joint letter to President Wilson in which it was stated that the electric railway problem had "recently assumed such serious national proportions as to warrant the prompt attention of the Federal Government," and recommending the appointment of a Federal board or commission, "whose duty it shall be to study and report upon the entire problem. . . . "

In response to this letter the President cabled his approval of the plan, and on June 1, 1919, the commission was created by him and went to work.

During the next two or three years necessary utility rate increases were allowed by regulatory authorities, credit was restored, expansion programs carried out—and then, in most instances, rates were returned to their previous level, and even to lower levels.

At the same time the electric utility industry, which was being seriously affected by the whole financial and economic situation, went about the immediate adoption of a policy of open publicity with the same systematic thoroughness which has characterized the conduct of its business almost since the days when Edison placed into operation the first central lighting station in Pearl Street, New York. Cooperating with the gas, street railway and telephone companies, it organized public utility information bureaus covering 38 of the states, and set about to furnish newspapers, periodicals, writers, public speakers, educators and the public generally with facts regarding the industry. There never was any secret about the source of the news supplied. There were few, if any, pieces of publicity which did not bear the imprint of some public utility information bureau, or some public utility company or some State or national organization of public utilities. In fact, any other procedure would have been foolish, because anonymity is anathema to the average American, and particularly to American editors of standing.

WHAT happened? All of the advocates of public ownership and operation of public services from parlor pinks to communist reds set up a wail sounding like a lost soul with its tail caught in the red-hot door of Tophet, claiming that all of this publicity was devised solely in the interests of private ownership and operation and in opposition to all forms of municipal, State or Federal ownership. This, of course, is remote from the truth, as any survey of the material sent out over a period of years will demonstrate; but, for the sake of argument, suppose that it had been partially true. What of it?

Why should not the owners and operators of the light and power industry defend their property rights in the courts of public opinion, just as the owners of any other business enterprise would defend their property rights against confiscation by the government, and seek to prove, if it can be proved, that government ownership and operation is not in the public interest? What would our agricultural organizations have to say if the government should take the position that a nation's food supply is of paramount importance to the people and attempt to seize all the farms in the United States, leaving our farmers no choice but to work for the government or seek other lines of occupation? The same question might be asked with regard to almost any industry, but the answer can easily be found in present-day conditions of industry and labor in Soviet Russia.

For years the industry was severely criticized for not extending its lines into rural areas and to small communities with greater rapidity. Financial obstacles, lack of interest on the part of the farmer, or the small community, making it difficult to secure a sufficient market for light and power to pay operating expenses, much less interest on the required investment, and physical and political difficulties were all brushed aside by the critics as matters of no moment.

WITHIN the past few years literally thousands of small communities have received electric service for the first time. This has been made possible by interconnection and consolidations of properties. Approximately 500,000 farms have been electrified. Yet the advocates of government ownership and operation refuse to recognize these developments as being to the credit of the industry, implying, in their criticisms, that it has simply widened its field for exploitation. They would have us believe that it is the better part of wisdom to have the government carry on these developments, charging at least a part of the cost to the taxpayers, rather than to require from those who obtain the benefits of the service the payment of a rate which will carry the investment and the operating expenses.

When the scheme of regulating public utilities as to rates and quality of service was first broached, the light and power companies looked at it askance in much the same way that the insurance companies looked upon the project of compulsory workmen's compensation insurance, or the railroads upon control and regulation by the Interstate Commerce Commission. For this attitude they were severely condemned by their critics. Now that the scheme of control and regulation by means of State utility laws administered by State commissions seem to be working out to the benefit of investors, consumers and the general public alike, and now that the public utilities are strongly in favor of it, the government ownership and operation folks claim that there must be something wrong with it and that some new, strange and untried scheme should be substituted for it. Their position seems to be that because the utilities no longer oppose it, commission regulation is a failure.

We are told frequently and emphatically that the utilities spend untold sums in the purchase of advertising space and that they do this solely for the purpose of influencing editorial opinion. Nothing is said about the fact that the utility business is just like any other business and must sell its product by similar methods. Nor is any mention made of the fact that a considerable portion of this advertising is for the

(Continued on page 721)

James E. Davidson Prize Paper

A Study of Merchandise Advertising

By KEO CURRIE and RAY WARREN

MISS CURRIE

This paper won the James E. Davidson first prize Award for 1928-1929. The authors are both employed in the Advertising Department of the Public Service Company of Northern Illinois.

*Miss Currie * became the company's advertising copy writer in May, 1925. Previously she was an editorial writer with a retail research organization in Chicago and with an advertising firm in Washington, D. C. She grew up in western Nebraska, attending the state university.*

Mr. Warren is chief clerk of the Advertising and Publicity Department and secretary of the Advertising Committee of the Public Service Company. He has spent seventeen years in the utility business in a variety of capacities. For three years Mr. Warren was on the National N. E. L. A. Customer Relations Committee and for three years, was a member of the Great Lakes Division of the Customer Relations Committee, serving one year as chairman. Mr. Warren received his school training at Lewis Institute, Chicago.

*Miss Currie has recently joined the staff of the Arnold Research Service, with headquarters in New York.

MR. WARREN

PART 1.

A METHOD OF BUILDING AN ITEMIZED BUDGET FOR APPLIANCE ADVERTISING

Based Upon Sales Volume and the Electric Load Revenue Derived from the Appliances Sold

AN investigation which was commenced a couple of years ago as an attempt to find a way to make retail electric appliance advertising more helpful in stimulating sales, led to definite ideas for a better control over the disbursement of the advertising appropriation and to a method for the solution of a public utility accounting problem of long standing. It is because it is believed that these ideas may prove of value to any public utility company engaged in the retail selling of home appliances that this account of the investigation has been prepared by those who initiated and carried out the study.

The study was made by means of figures on the advertising costs and the sales volume of a certain group of stores for the year 1927. The essential plan of procedure was to consider each kind of appliance a unit as to its advertising and as to its sales. The advertising given each appliance during the year 1927 was computed in dollars, based upon the amount of space given the appliance, either in newspapers or in some form of direct mail advertising. Some difficulty was encountered in obtaining sales volume figures to match against the advertising costs, as it was found that the cost of obtaining such data by separate appliances would be prohibitive. However, accurate figures were available as to the number of each appliance sold during 1927. Therefore, the sales volume for the year for each appliance was estimated as carefully as was possible, by establishing an average selling price for each appliance and multiplying this by the number sold during the year.

The study then proceeded, with two definite theories to be investigated: first, that each appliance should receive advertising in direct proportion to the sales volume it earns; second, that there must be some logical way by which the electric load added to a company's lines by the sale of electric appliances, may be made a definite factor in determining the advertising appropriation. The second of these two theories, the load revenue factor, will be discussed fully later on in this report.

Each Appliance Earns Its Own Advertising

It is a generally accepted practice in many lines of business to estimate total advertising expenditure upon a basis of sales. For the year 1927, for the retail stores whose figures were taken for the study, total merchandise advertising costs amounted to approximately 8 per cent of the sales volume of the year. Upon the theory that each appliance should receive advertising in direct proportion to its sales, the first step was to use the data at hand to see if each of the appliances had received approximately 8 per cent of its individual sales in advertising.

Since the purpose of this paper is to explain the methods developed by the investigation, rather than to present the complete budget, the figures on certain appliances will be used to aid in the explanation, but no attempt will be made to give detailed studies on all appliances. Thirty appliances, including all the important ones sold in 1927 by these stores, except portable lamps, were studied. Twenty were electric appliances, ten were gas appliances. Table I, shown above, compares the sales volume and the advertising costs upon two items; electric ranges and kitchen lighting units.

	Average Selling Price	Number Sold in Year	Estimated Sales for Year	Actual Advertising Cost	% of Advertising to Sales
Electric Ranges...........	$135	525	$70,875	$2,105	3%
Kitchen Lighting Units....	$4	3,335	$13,340	$13,579	101%

Table I

Table I makes clear that not all appliances had been receiving support in proportion to individual sales returns. One item, kitchen lighting units, had more money spent on it for advertising alone, irrespective of other selling expenses, than was received in the total sales of the appliance. In contrast to this item on which the advertising cost was 101 per cent of sales for the year, is another appliance on which the advertising amounted to only 3 per cent of sales. No reasonable excuse can be given for the difference in the treatment accorded the two items, except that the condition was not realized because no comparisons had been attempted on the basis of individual advertising and sales figures. This is admittedly a somewhat extreme instance of contrast. Whereas on total annual merchandise sales, the advertising was 8 per cent, here we have one item on which 101 per cent was spent and another on which only 3 per cent was spent. In many of the thirty appliances studied, the amount spent for advertising was fairly close to the 8 per cent established by the total figures.

TABLE II—Preliminary Budget Based on Sales

	Estimated Annual Sales	Percent for Advertising	Preliminary Budget	Increase Over 1927 Advertising	Decrease From 1927 Advertising
Electric Ranges...........	$70,875	8	$5,670	$3,565	
Kitchen Lighting Units...	$13,340	8	$1,067		$12,508

Table II

An Itemized Budget Based Upon Itemized Sales

In the table of figures (Table II) shown above, each appliance is allotted the amount of advertising which it would have received, at 8 per cent of its individual sales. For the sake of convenience in referring to it, this allotment to each appliance is called the Preliminary Budget Based on Sales. It is the first step in preparing the budget.

While it is not claimed that past sales can give exact dimensions for future advertising expenses, they are believed to be the starting point for determining the sound plan of expenditure. In planning to do a certain volume of sales in an ensuing year, it is wise to start from the facts shown as to past sales. The same applies to planning advertising and to budgeting its future expenses. This Preliminary Budget Based on Sales is later to be carefully analyzed at which time special consideration will be given to expected sales increases and various other influences. In that analysis, each appliance will be considered upon its own facts.

In the Preliminary Budget, a sum is set aside for advertising which is 8 per cent of the 1927 sales volume. Many will consider this too high a percentage to use. Any desired percentage could be used. However, to use a rather high percentage on past sales is equivalent to using a smaller percentage on the increased sales planned for during the year to come, and with that in mind the 8 per cent may not be excessive. In this particular study, the use of this percentage has advantages for the sake of comparisons, since it maintains the percentage already stated as existing between total actual merchandise sales, and total actual merchandise advertising costs for the year studied.

"Pioneer" Advertising

As shown by Table II, the Preliminary Budget Based on Sales, advises a sharp decrease in the amount of advertising to be given to kitchen units and an increase in the amount of advertising to be given to electric ranges. It will be interesting to look into the reasons why the kitchen unit advertising of 1927 was so extensive. Kitchen units were comparatively new in the territory served by these electric appliance stores. A campaign the previous year had resulted in the sale of a large number of kitchen lighting units. By 1927, however, a change in marketing conditions had taken place. Previous to the first year's campaign, wiring contractors paid little attention to the lighting of kitchens. It was sufficiently difficult to interest their customers in the installation of adequate lighting fixtures for the so-called important rooms of the home. In the kitchen, a simple drop cord with lamp often unshaded, was considered suitable. Apparently as a result of the extensive campaigning by the utility company, it became true that practically every wiring contractor includes a kitchen unit in his bid, that practically every architect includes one in his estimate, and that most home builders insist upon having the kitchen adequately lighted. Where one company had been handling the lighting unit business through its retail stores, there came to be about as many agencies for selling such units as there were electrical dealers and contractors in the district served.

Was the $13,579 worth of advertising by the utility company wasted? Certainly not all of it was wasted. Every lighting unit sold, whether by the company or by an outside agency, meant more business for the lines of the electric company.

A Budget for Pioneer Advertising

This raises the question as to the responsibility for advertising which increases the electric load revenue, and which is referred to as Pioneer Advertising. How far should a utility company go in pioneering an appliance not well known to the public, but which will increase its business as a firm supplying electricity—which is, of course, the business for which the company exists. In preparing a budget for the advertising of an appliance of the pioneer type, how can any estimate be made as to the amount of money to be set aside for such advertising? How, especially, can this be done at the very first when no sales record exists, or when sales have been so unimportant in volume that the usual percentage would not yield a large enough sum to purchase useful advertising?

The further question is raised as to the responsibility of the retail merchandise sales department in paying for such advertising. Is it fair to charge merchandise sales with an excessive advertising cost, on the theory that the electric company as a whole benefits from the increased load revenue derived from the use of the appliances? This question, which is chiefly an accounting problem, has been met in the past by creating promotional or new business accounts, separate from the merchandise advertising accounts, and charging to them all advertising costs on such appliances as were recognized as deserving or needing support as builders of load revenue. But how could such appliances be recognized, except upon a somewhat guesswork basis of personal opinion. We have already had one example of how the guess-work basis worked out in dividing advertising money to apportion it to kitchen units and ranges. Would it have been possible to guess in advance as to which of these two appliances should have had its advertising charged to a new business account?

Electric ranges, as a matter of fact, have been looked upon as deserving promotional support and the advertising of electric ranges has been charged to new business. This was undoubtedly justifiable in the early stages of selling electric ranges. However, as shown by Table II, by the time that annual sales consist of 525 ranges, a considerable sum is available for advertising, on a straight sales-budget basis. In other words, ranges have become at least partly self-supporting.

The kitchen unit, as a matter of fact, was not judged to be deserving of promotional support, possibly because it was considered a more easily salable item, and its advertising was charged to merchandise sales, even though the advertising cost was 101 per cent of sales. If it paid the utility company to spend this amount of advertising, due to increased return in load revenue on lighting bills, then surely, a part of the expense was a legitimate charge on the promotional or new business account. But how decide what part?

An Itemized Budget Based Upon Load Revenue

The purpose of the study, with regard to pioneering appliances, became one of finding a way to determine which portion of the advertising expense should be charged to sales and which portion should be charged to new business. Most of all, it was desired that a plan be devised for making the division upon some logical basis, eliminating guess-work as far as possible.

Since the idea back of permitting pioneer advertising to be done on certain appliances, is that they are good load-builders, the plan was hit upon of basing a secondary budget upon the estimated load revenue of each appliance (not of certain hand-picked appliances, but of all appliances) in exactly the same way that the Preliminary Budget Based on Sales was developed from the sales volume produced by each appliance.

To estimate the load revenue derived from each appliance sold, recourse was had to N. E. L. A. surveys and reports on this subject. In the case of such appliances as were not included in the N. E. L. A. reports, estimates were made carefully on local data and opinion. Table Number III presents the estimated load revenue of two appliances:

	Estimated Annual Load Rev.	Number Sold in Year	Estimated Load in Year	Actual Advertising Cost	% of Adv. Cost to Load Rev.
Electric Ranges...........	$55	525	$28,875	$2,105	7%
Kitchen Lighting Units....	$6	3,335	$20,010	$13,579	68%

Table III

The above table, worked out in the same manner as Table I, shows the estimated load revenue derived in one year from the use of the appliances sold during 1927, and compares to that revenue the actual advertising cost for the year. Thus, had the advertising expense been figured against estimated load revenue and not against sales volume, electric range advertising amounted to 7 per cent of load revenue, while the kitchen unit advertising amounted to 68 per cent of a year's load revenue.

Table No. IV presents the Preliminary Budget Based on Load Revenue. Here again, many will object to the use of so high a percentage as 8 per cent. There is a certain comparative value in retaining the same percentage used for the Preliminary Budget Based Upon Sales. As a matter of continued practice, distinct from the purpose of this paper to explain the study made, any budget based upon load revenue must take into consideration the life of the appliance. Various N. E. L. A. surveys have indicated that the average life of an appliance is from five to ten years. Calling it only five years, and using as the budget percentage only 2 per cent, would be the equivalent of taking 10 per cent of one year's load revenue. In view of this, the 8 per cent used seems sufficiently conservative. The next table, No. V, adds together the preliminary budgets based upon sales and based upon load revenue.

TABLE IV—Preliminary Budget Based on Load Revenue

	Estimated Total Load Rev. 1 Yr.	Percent for Advertising	Preliminary Budget	Increase Over 1927 Advertising	Decrease From 1927 Advertising
Electric Ranges...........	$28,875	8	$2,310	$205	
Kitchen Lighting Units....	$20,010	8	$1,600		$11,979

Table IV

TABLE V—Preliminary Total Budget

Electric Ranges		Kitchen Lighting Units	
8% of sales.................	$5,670	8% of sales................	$1,067
8% of load revenue.........	2,310	8% of load revenue.........	1,600
	$7,980		$2,667
Increase over actual 1927 expenditure................	$5,875	Decrease from amount actually spent, 1927.........	$10,912

Table V

It might be feared here that to arrive at the budget by assessing a sum based on sales and adding to that a sum assessed upon load revenue, would be to arrive at a total budget far in excess of a reasonable figure. Thirty appliances were studied. As in the two cases above, where the budget indicated an increase over the 1927 expenditure for one appliance and a decided decrease from the 1927 actual expenditures for the other appliance, various similar adjustments were indicated for other appliances, and the total for the thirty appliances was found to be very well in line with the total budget as arrived at by ordinary methods. When the total budget indicated by this method was compared to the quotas set for a new year, the budget was approximately 5 per cent of expected sales.

The budget, by this method, allots to each appliance an amount of advertising in direct proportion to what the appliance earns by its sales and by the load revenue it adds to the company lines. It is undeniably true that when an appliance is sold, no one can know that it will be in use in the town where it is sold or for the expected number of hours per year. However, because of the acceptance generally given to the N. E. L. A. averages, this point will not be argued here. It is believed that the budgeting plan here offered comes nearer a fact basis than any previous suggestion put forward as to how to draw the line between advertising expenses chargeable to merchandise sales, and those chargeable to a new business or promotional account. By applying this plan of budget-building, it is possible to charge the merchandise sales with that proportion of the budget which is based upon sales, and to charge the promotional account with that proportion of the budget which is based upon load revenue. This applies to every appliance. There is no need to guess as to which appliance deserves promotional support, and which does not.

Appliances Without Sales Records

Certain appliances are so new as to have no sales records, but each year when a new budget is prepared, the sales that have developed will automatically indicate a sales budget for the coming year. A few years ago, refrigerators had no sales record but they had to be advertised. The advertising was based upon an estimate of expected sales. Today, a large volume is done in this appliance. It ranked first of all electric appliances in this study of 1927 figures, in its dollar volume of sales. Part of its advertising expense became a legitimate charge upon merchandise sales. Under the old plan, all refrigerator advertising was charged to new business.

At present, electric dishwashers, electric exercisers and ultra-violet ray lamps have in many localities no sales records and their advertising must be based upon expected sales. As soon as they develop sales records, they will be earning their own advertising, based on sales, and based on load revenue.

It should be pointed out here that the electric manufacturer should furnish more than ordinary advertising aid when his appliance is new. Moreover, it might be well to consider asking the manufacturer to supply a greater share of the advertising when his appliance, new or old, is one which brings the electric company small load revenue compared to the sales it brings. An excellent example is the washing machine. It ranked fourth among the electric appliances as a sales producer, but was fifteenth in annual load revenue derived from the number sold. The load revenue of one machine in a year is estimated at only $2.50. The average selling price during the year on which the study was made, was $133. At this selling price, with machines of different types on display in the stores, it meant that a considerable sum of money was tied up in display and reserve stock. The utility company, thinking of it now in its primary business of supplying electricity, benefited very little in increase of load revenue, as a result of the large investment which it carried in washing machines for sale. If the company must make a $133 sale of another manufacturer's product, in order to increase by $2.50 the sale of its own product (electricity), then it should expect generous advertising assistance from the washing machine manufacturer.

All promising new appliances must be provided for in the budget, and probably no better plan offers, than to base the amount upon expected sales. This is guess-work, but only for the first year or two. The sums for these appliances are added to the total budget. On the other hand, some of the old established appliances will be found to earn greater budgets, both from sales and load revenue, than are needed for their advertising. Common sense will indicate some readjustments of the amounts put into the budget by the purely mechanical process of applying a given percentage. The analysis of the advertising needs of each appliance, in the light of expected sales, marketing conditions, etc., is an essential step in fixing the final budget.

Adjustment of Preliminary Budget

The electric iron's preliminary budget was $13,015. After due analysis, this was cut to $5,000, to be charged 70 per cent to a merchandise account, and 30 per cent to new business. This appliance, by the way, earned a greater load revenue than any other electric appliance studied, and was second only to refrigerators in annual sales. It may not be wise to take too seriously the theory that this item is near the saturation point. Whether or not it may be believed that 90 per cent of the families already own electric irons, it should not be overlooked that there is a large replacement business—and the iron sold for replacement is a better load-builder than the old iron, standing unused on a shelf. It is legitimate to charge a replacement sale's advertising cost partly to new business and partly to sales.

In the analysis of the Preliminary Budget for electric ranges, the sum indicated was not believed to be adequate. A consideration of marketing conditions locally, and a belief that this appliance had previously been under-advertised, led to the setting of a quota for greatly increased sales volume. Therefore, arbitrarily, if you like, but still for definite reasons, the final budget for the advertising of electric ranges was fixed at $15,000.

The Preliminary Budget for kitchen units, representing a decided decrease from the amount actually spent in 1927, was endorsed as sufficient. The reasons for this have already been referred to in this report.

Each of the thirty appliances was analyzed as to marketing conditions and special possibilities for future sales, and the amount of the Preliminary Budget was adjusted wherever sound reasons appeared to exist in favor of either an increase or a decrease in the advertising budget.

The fundamental principle of the budgeting plan is to consider each appliance separately. The application of the same percentage (8 per cent in this particular study) to all appliances as a preliminary step, is valuable in pointing out discrepancies in past practice. Deviations from this average will be found necessary, but in each instance will be made for definite reasons.

Actual Application of the Study's Results

The ideas developed in this study were submitted to the utility company's advertising executive committee late in 1928, and were endorsed subject to their being proved workable in actual use. The Final Budget on most of the appliances was not fixed until after this endorsement had been given to the ideas presented. It was considered important that such final budgets be determined by analyses made jointly by representatives of merchandise sales and advertising departments.

Because it was late in 1928 before the study was completed and endorsed, and because it was desired that it be put into immediate use without waiting for the completion of 1928 activities and compilation of new data based thereon, it was decided to use the data already gathered on the basis of 1927 advertising and sales figures, as a basis for the 1929 budget. Naturally, 1929 sales quotas would be much larger than 1927 sales, and in the analysis of the Preliminary Budget to fix upon the final budget for 1929, special care was taken to make ample allowance.

Among the difficulties, of which many are certain to be encountered when theories are reduced to practice, was the problem of exactly how to keep advertising cost records and report them to the accounting department in such manner that incoming bills for advertising, could be allocated to sales and new business accounts, in correct proportion to the sales volume and load revenue of each appliance. It was decided that the advertising department, in okaying each bill for payment, should endorse thereon the portion to be charged to each account.

An accurate but somewhat involved routine was arranged for supplying the information needed for making the division between accounts. Usually a merchandise advertisement presents several appliances. The first step was to divide the total cost of the advertisement according to the space each appliance used. Then it was necessary to determine how much of each appliance's share of the cost should be charged to new business, and how much should be charged to a merchandise sales account. This was determined by applying the same percentages which represented the relationship between sales and load revenue in the total budget allowed to each appliance. Suppose, for example, that an advertisement costing $1,000 was occupied equally by advertising for washing machines and irons. Then each appliance must pay for $500 worth of space. By referring to the Final Budget for the year, it was found that the budget for washing machines was $5,000 and that 90 per cent of this, $4,500, was based upon merchandise sales while only 10 per cent or $500 was based upon load revenue. It was found also that the budget for electric irons was $5,000 and that 70 per cent of this, or $3,500, was based upon merchandise sales, and 30 per cent of it, or $1,500, was based upon load revenue. Therefore, of the $500 which washing machines must pay for this advertisement, 90 per cent or $450, should be charged to the merchandise account, and the remaining 10 per cent or $50 to new business. Similarly, of the $500 to be paid for by irons, 70 per cent or $350 should be charged to merchandise, and 30 per cent or $150 to new business. And, of course, in okaying the bill for $1,000, the advertising department would indicate that $800 should be charged to the merchandise account, $200 to new business.

The above routine is now in use and will be adhered to during the year, but because it involves a great deal of detailed clerical work, another method of handling the matter has been worked out and will be recommended for use after this year. If accepted, the new routine will charge all bills to a merchandise account, and will each month pass a credit to that account, so much for each appliance sold during the month. The amount of this credit will be based upon the load revenue earned by the particular appliance. For example, the estimated annual load revenue of an electric iron is $6. If the Budget was built by taking 8 per cent of the load revenue from irons sold last year (or 8 per cent of the load revenue from the number of irons in the sales quota), then it would follow that 8 per cent of the $6, 48 cents, could be credited to merchandise sales for every iron actually sold. If 1000 irons were sold in a month, the amount credited to merchandise sales at the end of the month would be $480. The more irons sold, the greater would be the credit given. A washing machine is estimated as bringing in $2.50 a year in load revenue. Eight per cent of this amount, or 20 cents, is the advertising cost chargeable to new business. If 250 washing machines were sold in a month, the credit to the merchandise sales account to which all the advertising costs had previously been charged, would be $50. There are two great advantages in this routine; it avoids the complicated clerical work of apportioning each piece of advertising and each advertising bill, and it would probably prove a stimulus to greater sales of those appliances on which large credits can be earned, namely, of those appliances which are the best load builders. Each month a report would show the auditing department the sales results and the corresponding credit earned for the merchandise sales advertising account. A single credit carried to the merchandise sales advertising account from a journal entry, with debit carried to the new business account, would take care of the matter. Thus every charge to new business could be accounted for on a logical basis of facts accomplished.

This report of the study has been made in considerable detail, because it is believed that if any utility company is sufficiently interested in the ideas developed to wish to put them into practice, it will wish to see how the investigation proceeded step by step and how the conclusions were reached. It would thus be possible to adopt or reject some of the steps in the procedure as desired. If this study were followed in whole or in part by another utility company upon a basis of its own sales and advertising figures, it is believed that information of great importance to the company would result. If a number of utility companies should make the study, all on like bases, and should report results to the N. E. L. A., data of great importance to the industry would undoubtedly be made available.

PART II.

SEASONAL DISTRIBUTION OF APPLIANCE ADVERTISING

The Study of Merchandise Sales Advertising concerned itself primarily with determining how much of the advertising appropriation to give to each appliance. It also investigated the question of when to give advertising support to each appliance and worked out a simple plan of breaking up the budget for each appliance so as to indicate the months in the year when the money should be spent.

The monthly allotment was made by sales. The records showed, for example, that sales of heating pads had been distributed by months as follows:

Number of Heating Pads Sold Each Month

January	140	April	100	July	50	October	135
February	145	May	85	August	60	November	150
March	140	June	70	September	90	December	485

The above figures are not for one year alone, but are the average results each month over a three-year period. It is immediately evident that the best month for sales has been December, but that sales are made every month in the year. Since January is a month when volume is hard to get, and since it was not deemed necessary to campaign this appliance in order to secure the December sales, it was decided to use a considerable portion of the heating pad advertising budget in an attempt to push a January-February selling season for heating pads. The heating pad budget ($1,000) was therefore divided as follows:

Heating Pad Budget

January	$400	October	$100
February	100	November	100
September	100	December	200

The distribution of sales of this appliance by months is shown more graphically in Chart A which follows. It will also be noted that the plan to develop a January-February selling season in 1929 worked out satisfactorily. These months had been the best ones outside

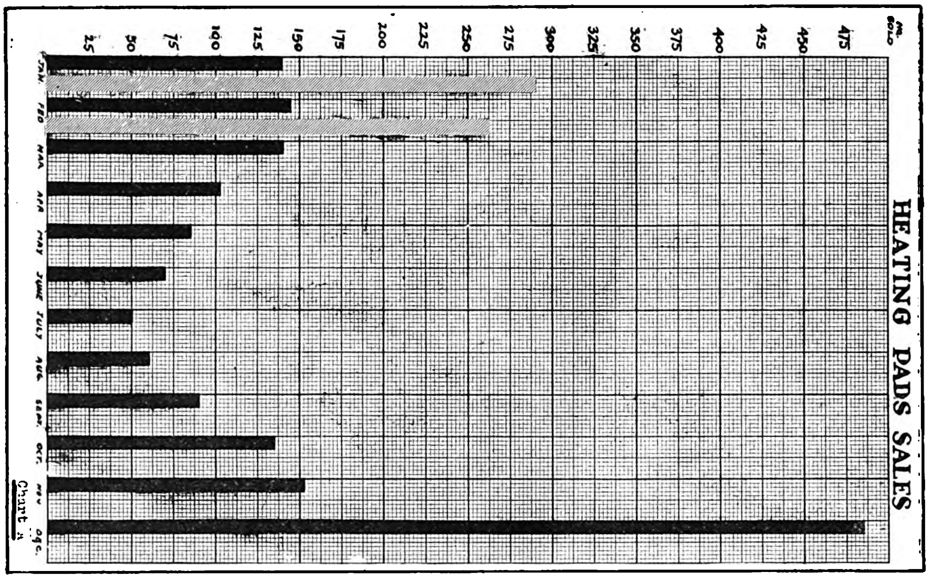


Chart A—Heavy black bars indicate average monthly sales of heating pads for three previous years, while the diagonally shaded bars show January and February, 1929, *sales.*
(turn page to left to read)

of the Fall and Christmas season. A little extra effort made them practically twice as rich in sales.

"Best Sellers" in Electric Appliances

Reference has previously been made in the study, in two or three instances, to certain appliances as being the best revenue builders or the best sales producers among electric appliances. In making the seasonal distribution of advertising budgets, it is very important to refer to data which shows where volume comes from, in getting the sales results of any month. This must always be done so long as the efficiency of the merchandise sales department is judged by the volume of sales it secures, rather than by the load revenue of appliances sold.

Chart B, at bottom of page, lists the five best-selling appliances in each month of the year. Electric irons appear on the list in all but two months. (In those two months, as a matter of fact, they ranked sixth). Electric iron sales are made in considerable volume every month in the year. Iron sales are poor in January compared to iron sales in many other months. Compared, however, to the sales obtained from other appliances in January, iron sales were important. Therefore, a portion of the electric iron budget was set aside to be spent in January advertising.

The rank of appliances, based upon annual results, is given for all electric appliances included in the study, in Chart C which follows. In the first column, appliances are listed according to annual sales, in the second column according to annual load revenue derived, and in the third according to their total income—sales plus load revenue. These lists were also found very helpful as reference material in order to avoid neglecting important appliances.

The Budget by Months

The budget for each appliance was divided for spending in the months

(*Continued on page* 724)

RANK OF
TWENTY ELECTRIC APPLIANCES

Rank*	Annual Sales Volume	Annual Load Revenue	Annual Combined Income**
1	Refrigerators	Irons	Refrigerators
2	Cleaners	Ranges	Irons
3	Irons	Kitchen Units	Cleaners
4	Washers	Refrigerators	Ranges
5	Ranges	Toasters	Washers
6	Toasters	Cleaners	Toasters
7	Ironers	Desk Fans	Kitchen Units
8	Waffle Irons	Space Heaters	Ironers
9	Desk Fans	Percolators	Waffle Irons
10	Percolators	Waffle Irons	Desk Fans
11	Kitchen Units	Ironers	Percolators
12	Sewing Machines	Water Heaters	Space Heaters
13	Heating Pads	Ventilating Fans	Heating Pads
14	Space Heaters	Heating Pads	Sewing Machines
15	Ventilating Fans	Washers	Ventilating Fans
16	Water Heaters	Curling Irons	Water Heaters
17	Hair Dryers	Hair Dryers	Curling Irons
18	Curling Irons	Cookers	Hair Dryers
19	Sewing Motors	Sewing Machines	Sewing Motors
20	Cookers	Sewing Motors	Cookers

*Based on Dollar Value of appliances sold in 1927.
**Sales plus load revenue.

Chart C

MONTHLY "BEST SELLERS" IN ELECTRIC APPLIANCES

Rank*	January	February	March	April	May	June	July	August	September	October	November	December
1	Washers	Washers	Refrigerators	Refrigerators	Refrigerators	Refrigerators	Refrigerators	Refrigreators	Refrigerators	Cleaners	Flat Irons	Cleaners
2	Cleaners	Cleaners	Washers	Cleaners	Cleaners	Cleaners	Desk Fans	Ranges	Flat Irons	Flat Irons	Cleaners	Flat Irons
3	Flat Irons	Refrigerators	Cleaners	Washers	Ranges	Ranges	Ranges	Flat Irons	Ranges	Refrigerators	Refrigerators	Toasters
4	Refrigerators	Flat Irons	Ranges	Ranges	Flat Irons	Flat Irons	Washers	Washers	Cleaners	Ranges	Ranges	Waffle Irons
5	Ranges	Kitchen Units	Ironers	Flat Irons	Washers	Washers	Cleaners	Cleaners	Washers	Toasters	Toasters	Percolators

*Based on Dollar Value of Appliances Sold. Example: Electric washers produced greater sales volume than any other appliance sold in January.

Chart B

Harriet Billings Prize Paper

The Human Side of a Balance Sheet

By P. O. JOHNSON

IN this day of tremendous endeavor the average person becomes calloused to hearing and seeing large figures. He becomes so familiar with numbers totaling millions of dollars that the presentation of a balance sheet seems to be more a result of mathematical gymnastics than a reflection of industry and endeavor. Men and women outside our industry witness these statements, built up and recorded in perfect balance, yet they perhaps cannot pause in their busy work-a-day world to realize just what is represented in these compilations of figures taken from our industry; yet these statements literally teem with the labors of men and women far removed from accounting practices.

The balance sheet is perhaps the most important report the accounting department is required to prepare. A balance sheet, properly constructed, will reflect sources of capital and the investment of this capital. There is, however, a human element reflected in a balance sheet which is too often overlooked. In this day when the electric industry is facing investigations by Federal and State Commissions it might not be amiss to call to the investigators' attention some human facts reflected in the balance sheet. Suppose we take a balance sheet of the electric industry and examine it to see if we cannot find something in it other than cold figures.

Property Account—the Human Elements

Let us start with the Property Account, which is generally the first item we find on the asset side of the balance sheet. We find in this account, real estate, steam and hydraulic generating plants, steel tower and wooden pole transmission lines, substations for transforming electricity to proper distribution voltages, overhead and underground distribution systems which carry the current to its ultimate destination, office buildings, warehouses and garages. This property is worth over ten billions of dollars today. Let us examine the above and see what this property means to the country and its future prosperity. What has all this done for labor? Can you estimate the millions of dollars paid in wages each year to the workmen who were responsible for the manufacture and erection of all this material, and can you imagine the number of men required to operate these properties?

Mr. Johnson's paper won the 1928-29 *Harriet Billings Prize Award. The author is Traveling Auditor for the Northern States Power Company, and has served in various capacities with the Byllesby Organization since* 1913. *He has been a member of several different N. E. L. A. Accounting Committees during the past eight years*

What does all this property mean to commercial establishments, factories, etc? Manufacturers, through motors connected to machines in their factories, have been able to discontinue their individual steam plants and purchase power a great deal more cheaply from the electric companies. It is no longer necessary to operate an entire factory when only a part of the machines are required. This economy in operation is reflected in the price of the goods manufactured, and is ultimately passed on to the consumer.

What does all this property mean to the home? Electricity has done wonders in the home. Think what it has done to lighten the burdens of housework. A mere turn of a switch and your washing machine starts washing your clothes, an electric range cooks your meal, a dishwasher washes your dishes, a refrigerator keeps your food in good condition, a vacuum cleaner cleans your rugs and furniture; flatirons, mangles, toasters, percolators, curling irons, radios, heating pads and many other conveniences are operated by it. Electricity has changed our standards of living. Isn't there something human about all this? The cold figures on the balance sheet are beginning to warm up a bit and reflect some of the good things about the industry.

What has this electric property done for agriculture? The electric industry has always recognized agriculture as a basic industry and during the past few years many experimental lines have been built to demonstrate the various uses of electrical energy on the farm. Electricity on the farm is no longer a luxury. Standards of living have been changed in the farmers' homes through its use while the farmers are more and more realizing the economic value of electric service. Today electricity on the farm is used for light, cooking, washing, ironing, ventilation, refrigeration, dishwashing, radio, heating, cleaning, sewing, milking, water pumping, sterilizing, separating cream, churning, grooming animals, ensilage cutting, grain and forage grinding, incubator heating, straw cutting, bone grinding, corn husking and shelling, hay hoisting and baling, tool grinding, irrigation, threshing, well drilling, etc. It has been the means of keeping the younger generation on the farms when otherwise many would have gone to the cities to enjoy these modern conveniences. Farmers today can enjoy all the advantages of electricity on the farm without the high taxation rates applicable to urban centers.

Investments—the Human Elements

The next item we generally find on a balance sheet is Investments. Let us examine this account for a minute to see what we will find. We will probably find in this account, the capital stocks of hundreds of small electric plants which have been purchased by the larger companies. These small plants before being taken over by the larger companies were operating old type inefficient steam plants, and their transmission and distribution systems were of old type construction reflecting excessive line losses. These inefficient power plants will be abandoned and the current will be furnished from a transmission line connected to a large efficient generating station. The transmission and distribution system will be reconstructed to the latest type of construction and the economies effected in generation and distribution will be passed on to the community served. Cheaper electricity and better service! One large middle-Western concern that has increased its output of electricity forty-nine times during the last twenty-five years has increased its revenue for this electricity but twenty times. This will give one some idea of how the electric rates have decreased to the public during this period. Isn't there something human about this?

Current Assets—the Human Elements

The next items we generally find on a balance sheet are Current Assets, such as cash, receivables, materials, etc. Executives of large companies are always mindful of the fact that these current items must never get below a certain amount. What does this mean to the public? Suppose the cash account is low, an inadequate supply of material and fuel on hand, and the property is not insured against fire, etc. What could happen? A flood might wreck a power plant, a storm might wreck a transmission line, a fire might destroy property necessary to give electric service, or a strike in the coal fields might cause a shortage of coal. Serious things might happen if a power company should be put out of commission for any length of time. The executives of electric companies, however, keep human welfare in mind by having adequate reserves of cash, supplies and fuel on hand to meet these emergencies quickly so that there may be no serious delay in repairing the property. Is this not human?

Liabilities—the Human Elements

Now we will turn over to the Liability side of our balance sheet, and the first items we find are Bonds and Stocks. Did you ever stop to think where these bonds and stocks are and why they were issued? These bonds and stocks are held by banks, insurance companies, investment houses and millions of individuals. The very nature of the electric industry, the necessity of it, and the things electricity has done for human welfare, makes it a desirable investment. The stability of the investment is one of the prime factors which has permitted the industry to command funds. The consumers of electricity are more and more realizing the possibilities of its use and recently have created a demand for this investment which, in many parts of the country, has exceeded the supply. Employees in the industry have invested millions of dollars in stocks and bonds and are using the interest to raise their standards of living, making happier and better homes. Isn't there something human in all this?

The next items we find on the balance sheet are Current Liabilities, such as notes and accounts payable, accrued interest, taxes, etc. These items represent amounts payable to concerns from whom are purchased supplies, and to local, State and Federal governments. It has always been the practice of an electric company to purchase as much of its material and supplies as possible in the territory it serves. This tends to create better business conditions and prosperity throughout the territory served.

Operating and Depreciating Reserves

The next items we generally find are Operating and Depreciating Reserves. Power plants, pole lines, buildings, etc., through constant use, new inventions and changes, in time become obsolete and must be replaced by larger and more efficient plants, etc. The executives of the industry, looking far into the future, have created large enough reserves to take care of these replacements so that the public may at all times have service from the best obtainable equipment. Human welfare was certainly in the minds of these executives when they gave consideration to adequate reserves for renewals.

Surplus—the Human Elements

The last item we generally find on a balance sheet is Surplus. This item represents the balance of gross revenue after expenses and fixed charges have been deducted and is available for dividends to stockholders, emergency reserves, etc. The millions of stockholders in the industry who have invested their savings look to this account for their dividends. The electric industry is entitled, according to law, to a reasonable return on the fair value of its property. There are a number of people, however, who continue to talk public ownership of electric utilities and who are instrumental in enacting laws which make it extremely difficult to operate under. This not only jeopardizes the industry, but it is detrimental to public welfare because it discourages private initiative. Electric utility service is not a function of government, and a number of State and municipal undertakings in the electrical field have been failures and proved very expensive to the taxpayers.

I have tried in a very brief way to bring out some of the human things represented in a balance sheet, and would like to suggest to all public utility accountants that they bring out the good points of the industry in every possible way, thus increasing their usefulness to the industry.

LIFE

To smile, though games be lost or won;
To earn our daily bread;—
And when at last the day is done
To tumble into bed.

—*Griffith Alexander.*

SURGES AND FLASHOVERS

By Fred W. Herbert

Director, Service Department, NELA

The most interesting man on earth—for you—lives in your mind and body. Are you giving him the best life you can?

* * *

They make kitchenettes so small that a man couldn't get in to help his wife doing the dishes—if he wanted to.

* * *

In order to reduce, a young lady tried horseback riding. She began falling off right away.

* * *

You can't put much across by getting cross.

* * *

The only good place for a knocker is on the outside of the door.

* * *

"Mary had a little lamb,"
The ancient poet wrote.
Now, that Mary has grown up
She tries to get your goat.

* * *

You can often stop a fight by running away before it begins.

* * *

One wife too many does not always mean bigamy.

* * *

The smartest person is not the one who is quick to see through a thing, but the one who is quickest to see a thing through.

* * *

By consulting a spiritualist you get only a medium education.

* * *

Leather makes good shoes but banana skins make better slippers.

* * *

You don't need any cash capital to start a rumor.

* * *

In 1790, at a reception in George Washington's honor, it took 2000 candles to illuminate the hall, costing $10.00 per hour. Electricity giving the same degree of illumination today would cost but .20 cents per hour.

* * *

Success comes in cans, failures in can'ts.

* * *

Based upon present figures we are convinced that women wear less clothes than they used to.

* * *

The ——— Church advertised a Rummage Sale as follows: "Ladies of this church have cast off clothing of every kind. On display every afternoon in the basement of the church."

* * *

You can make a good impression on a child with a slipper.

* * *

He took one drink of bad liquor and then stopped drinking.

* * *

Even a yeast cake knows that success depends on work.

* * *

You have to be able to be fashion-able.

Behind the Veil

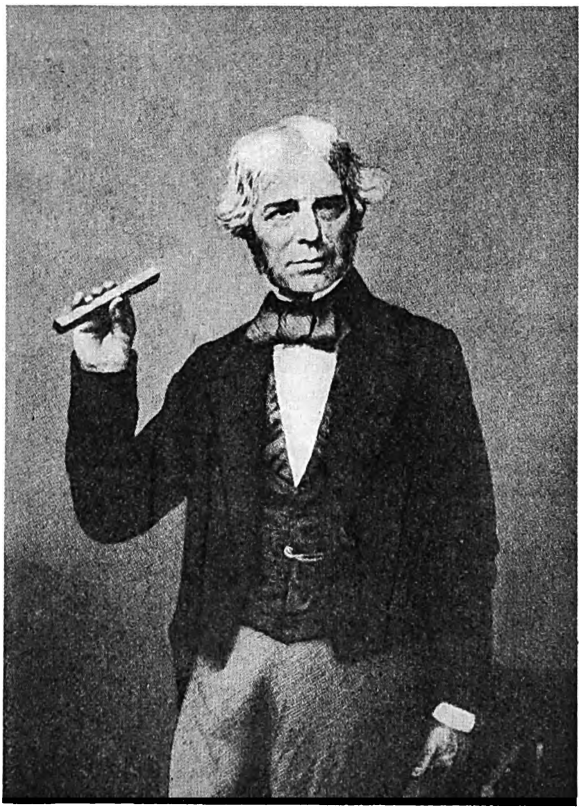
The God in the Machine

By Ernest Greenwood

The eighth of a series of articles portraying against a social-historic background the evolution of the electrical industry and the chief personalities that have been instrumental in its growth.

IN 1804, the year in which the German, Albert Winsor, gave his exhibition of lighting with artificial gas in the Lyceum Theater, London, a small, thirteen year old boy was apprenticed to one Riebau, a bookbinder. His name was Michael Faraday and his father, James Faraday, the blacksmith, considered schools luxuries intended only for the wealthy. The boy must learn a trade and the sooner the better. In 1800 or 1801 Sir Humphry Davy, who, next to Faraday's wife, was to become in later years the outstanding influence in the life of the young apprentice, had produced an electric arc, to be followed two years later with a crude demonstration of illumination by incandescence.

IT is sometimes interesting to trace a chain of simple and seemingly unimportant events, when they apparently have led to something which has changed the history of civilization. Had James Faraday decided to make a carpenter or a blacksmith out of his son, or had he had the means to send him to school, it is quite possible that certain books would never have come to the son's attention. Had he not been apprenticed to this particular bookbinder he probably would never have met the customer who gave him a few shillings to buy a seat in the gallery of the Royal Institute while Sir Humphry Davy lectured. Had these things not happened, the development of the electrical industry as we know it today might have been indefinitely postponed. For, out of these simple events came the dynamo, the god in the machine, transforming a few costly laboratory experiments into the greatest physical or mechanical force the world has ever seen. Every invention produced, from the days when primitive man found out how to make rude weapons to the wonders of present day life, pale into insignificance when compared with the dynamo.



MICHAEL FARADAY

Before we begin to follow Faraday through his eventful life, we must once more turn back the pages of history in order to understand just what it was that he eventually produced and why his name has become immortal in the history of electricity and magnetism. The Chinese may or may not have known and made use of the magnetic compass 2600 years before the Christian era—it did not come into use until the fourteenth century. Thales discovered that amber, when rubbed, would attract light objects, and the ancients knew that the loadstone would attract metals. But these were little more than amusing mysteries and hardly worth the serious study of a philosopher.

The glories of Grecian and Roman civilizations came and went, followed by the Dark and Middle Ages with their centuries of alchemy, witchcraft and superstition, until we arrive at the beginning of the seventeenth century and Dr. William Gilbert with his "De Magnete." In this great work he systematized what knowledge there was on the subject of electricity and magnetism, contributing at least one startling idea of his own, which was that the earth is nothing but a huge magnet, thus accounting for the action of the needle in the compass.

GILBERT was followed by Robert Boyle, who was born in 1627 and who wrote a book on "The Origin of Electricity." As Grove Wilson tells us in "The Human Side of Science," Boyle did not know very much about the origin of electrictiy, but "he tossed off one new idea that helped later investigators: the attraction between rubbed amber and the pith ball is mutual."

Otto von Guericke, a German born in 1602, made the first machine for generating electricity. This was nothing more or less than a ball of sulphur revolving under friction. It was only a toy, but it was a generating machine. The Frenchman, C. F. de C. du Fay, who died in 1739, discovered that electricity caused by rubbing glass and that caused by rubbing amber were not alike, thus raising the question as to how many kinds of electricity there are; which question remained unanswered for a hundred years. In 1675, Sir Isaac Newton constructed an electric machine wherein the sulphur globe was replaced by glass, although history has given Francis Hawksbee the credit for being the first to make a machine of this kind. In 1745, the Leyden jar was discovered, and in 1747 William Watson, applying the discoveries of John Wood, the English architect, transmitted electricity over a circuit of four miles—two miles of wire and two miles of ground.

Benjamin Franklin was fascinated by the Leyden jar, but a single jar wasn't big enough for him and he proceeded to show the world how to hook up a number of jars in series, giving him a chance to "store" up a lot of electricity and thus make experiments that were formerly impossible. Until the time of Allesandro Volta, however, scientists had not solved the problem of getting electricity in large quantities.

The Voltaic pile made possible Sir Humphry Davy's electric arc and his experiments of illuminating by incandescence. But even today, while the chemical production of electricity is successful and reasonably efficient on purely physical grounds, it is economically hopeless. The space, weight and cost of batteries, per unit of capacity, is so great as to be beyond all reason as a source of light and power. What was needed was a device for converting mechanical energy into electrical energy, and this device—the dynamo—is the keystone of the electrical industry and of modern power supply generally.

During the years 1804 to 1812, young Michael Faraday continued to bind books in the bookbindery of Riebau, who frequently said to him: "Go ahead Michael; read all you please. You will be no worse a bookbinder for knowing the insides as well as the outsides of books." And so it happened that one day when the young apprentice was binding an encyclopedia he came across an article on electricity. Michael Faraday knew nothing about electricity, but at that time the sum total of all the knowledge in the world was small, and he probably said to himself: "It will not take me long to learn all that is known about this strange electricity, because not much is known."

Next, a book entitled "Experiments in Chemistry" came his way. With what little money he could save he bought cheap and simple apparatus and set to work to perform the experiments it described. His progress, from this time on until his first meeting with Davy, is told in dramatic fashion by Wilson:

"The farther he went along that road the more interesting it became, and the more vivid was his curiosity. No book of science could get away from him. It was a case of genius making a road for itself. Poverty, work, ignorance, were only obstacles around, or over, or through, or under which his spirit would find a way. How he laughed as an experiment came out exactly right! Always in this man there was a great fund of laughing enthusiasm, a dashing audacity hiding behind an honest modesty. Without this audacity he probably would have spent his life as a bookbinder, and the world would never have worn a path to his door.

"What could a bookbinder apprentice want with a seat in the gallery at the Royal Institution while Sir Humphry Davy lectured? But this boy wanted that seat, and he had the effrontery to mention his desire to one of Riebau's customers. It was unheard of, it was preposterous, but the customer was tolerant. It would cost him a few shillings. But to what better use could he put his change? Buying immortality for the price of four tickets to lectures on science!

"Michael went to those lectures. He listened, he made notes, he understood what was said. Later, in his shabby little room at 18 Weymouth Street, he wrote out his notes, elaborating Davy's lectures, proving in this way that he knew what was what and had got the meat out of Davy's words. Did he realize, as he sat laboriously writing, writing, until his arm ached and his head whirled, that he was on the verge of a great change? Who ever realizes a thing of that sort?

"YET a change was needed. This bookbinding was not all roses. Riebau has been all right, but this De La Roche, for whom he went to work as a full-fledged craftsman, was not like Riebau. Hot-headed and emotional, he poured out his words and did his thinking afterwards. For him one bound books and confined one's interests to the outside only. No reading of scientific articles in this man's shop. Get that nonsense out of your head. Michael had been spoiled by Riebau, and this new, harsh task-master constantly rubbed him the wrong way. Also he was now learning things about business and the way it was carried on — and the more he learned, the more he felt it was not for him.

"But how to get away from it? There was the call of science, but how could one make one's living at science? Michael was no expert, he had no degree, he knew nothing of mathematics. He had no friends; that is to say, no influence. He was just a poverty-stricken genius, made into a bookbinder, and he was fast learning to hate his trade.

"His rare audacity, hidden behind honest modesty, nerved him. He sat down and wrote the great Davy a letter, enclosing the notes of the lectures as 'proof of my earnestness.' Then he waited, uncertain—more than two-thirds convinced he would never even hear from Davy. Davy was the most popular lecturer in London, one of the greatest scientists in the world. How could he take time to answer a letter from a poor bookbinder?

"But Davy answered kindly, and made an appointment for a meeting. By that act he made his most astounding discovery: he found Michael Faraday."

A month later Faraday was employed by Davy as a laboratory assistant at twenty-five shillings, or about six dollars, a week. All the world, as it now sits reading by electric light or whirls across town in electric trains or warms itself before an electric heater, can rejoice in that decision and thank Humphry Davy for giving Michael Faraday a chance.

Six months later Davy took Faraday to Europe with him, and for eighteen months he was little better than a valet to his employer. As Wilson says, "There's a picture for you! The keenest student of electricity in the nineteenth century acting as a valet, body servant, to a proud and irritable man with a proud and silly wife! But at that time 'she liked to show her authority, and at first I found her extremely earnest in mortifying me,' said Michael. And this earnestness led to an embarrassing situation in Geneva.

"Continental scientists found Michael worth talking to, and it never occurred to them that he was socially inferior to Davy. Certainly such an idea did not come to Gaspard de la Rive, professor of pharmaceutical chemistry at the Academy of Geneva. Gaspard liked this young Michael, and when the Davys were guests at his home he assumed that they would all dine together. Lady Davy and Davy himself had other ideas and said so. De la Rive was shocked and told the Davys exactly what he thought of the whole business. That didn't help Michael, who dined, solitary, in a separate room." De la Rive should have given a dinner in Faraday's honor, but that would have been too perfect.

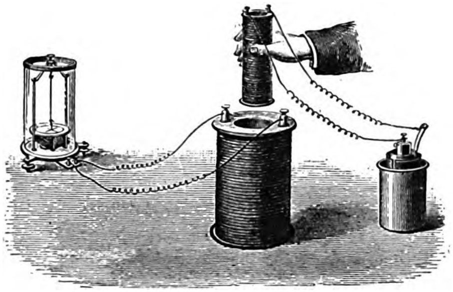
Davy became so jealous of Faraday that when the latter was proposed for membership in the Royal Society he ordered him to withdraw his name. This Michael refused to do, and Sir Humphry, who was then president of the Society, said he would throw the name out himself, to which Faraday replied: "I am sure Sir Humphry Davy will do whatever he thinks is for the good of the Royal Society." The name was proposed, and when the vote was taken there was but one blackball. No one knows who cast it, and it doesn't matter. The valet had become a member of the Royal Society.

In 1820, Davy had magnetized a bit of soft iron by running a current of electricity around it. In 1822, Faraday wrote in his note book: "Convert magnetism into electricity." For nine long years he struggled with this problem. Finally on October 17, 1831, sixteen years before Edison was born and thirty-four years before the crippled Steinmetz first saw the light of day in a cheap flat in Breslau, accident, or fate, favored him. He got hold of a cylindrical bar magnet, three-quarters of an inch think and eight and one-half inches long. He wound 220 feet of copper wire into a hollow cylinder. To this wire he attached a galvanometer. There was no current in the wire.

He brought one end of the magnet close to the wire and there was no movement in the needle of the galvanometer. Suddenly he thrust the magnet all the way into the coil of wire and the needle moved. Drawing it out, the needle moved again. He had found the answer — mechanical movement was needed, and the principle of the dynamo was discovered. All the electrical apparatus that we use today was lying hidden in this discovery and in the simple machines Faraday built from that time on. He had tapped the universal source of electricity.

BEFORE proceeding with the history of the development of the dynamo from this time on, it may be well to stop a moment and ask the question: "Just what is a dynamo?" For the following simple and most satisfactory explanation, the author is indebted to Mr. Alexander Maxwell of the National Electric Light Association Headquarters staff.

> The dynamo produces electrical energy by utilizing the principle of magnetic induction. Magnetic induction is the phenomenon whereby electric currents are generated or "induced" in conductors of electricity by the action of magnetic fields upon them, and, conversely, whereby currents of electricity produce magnetic fields about themselves. A magnetic field is an emanation in space from a magnet or an electric current which for its dimensions may be roughly compared with emanations of light from a luminous source. The magnetic emanation is capable of exerting force and performing physical work, as anyone may observe by the "attraction" exerted by a magnet. Like other physical forces, this one may be utilized, by appropriate mechanism, to do work continuously; that is to convey energy from one form to another.
>
> The presence of induced electricity on an electrical conductor in a magnetic field may be compared with the light present upon the surface of an object itself non-luminous, when it is in a field of light produced by a luminous source. At least one phenomenon is not more remarkable than the other, but that is about as far as the analogy will go, since sensible light does not exhibit the mutual reactions proper to the electro-magnetic field. If we were speaking of total radiant energy instead of sensible light, we might labor the analogy a little more, but this subject is quite as difficult as the dynamo itself.
>
> The next important point is that electricity is generated, not by the mere presence of a magnetic field, but by changes in the strength of that field; in fact, quite strictly in proportion to the rate of change of the field. Thus, a loop of copper wire lying near the poles of a horseshoe magnet, both being at rest, will have no electricity generated in it, although it is immersed in a magnetic field. But if the loop of wire is moved in and out of the magnetic field, or if the magnet is moved to the same purpose, then electricity will be generated in the wire; the faster the motion the more electricity will be generated, in exact proportion; the stronger the magnetic field the more electricity, in exact proportion.
>
> Perhaps it will be seen from this that the magnetic field is a kind of stress; it is energy in storage. And it may also be seen that the conversion of energy is a kind of displacement phenomenon, an adjustment of balances. It is as though, when the wire and the magnetic field were at rest, both had adjusted themselves to the arrangement and were content, the wire to be in that particular strength of magnetic field and the field to have the wire within it. But if a change takes place; for example, if the magnetic strength changes, thereby increasing or decreasing the stress or stored energy, it is necessary, physically, for the wire to adjust itself to this changed condition, and this is accomplished by the flow of electric current, which is itself a transfer of energy. Thus an appropriate rearrangement of forces is accomplished.


The Beginning of the Dynamo

Faraday's experiment with two wire-wrapped bobbins

> Many physical analogies will occur to anyone. For example, the transfer of heat, or better, the conversion of latent to sensible heat, or the potential energy of water at a height, or the weight of a pile driver, where both possess energy, not because they are water or iron, not even solely because they are heavy, but by virtue of the potentiality they have for falling down and expending the energy bestowed on them by gravity.
>
> The dynamo is merely an arrangement of the loop of copper wire and the magnet that produces a magnetic field. It is on a grand scale, of course. The magnets are electromagnets producing very intense magnetic fields, the wires are of many turns and great length, so arranged that the relatively small amounts of electricity generated in short elemental lengths are added together, and mechanical means are provided for continuously moving either the wires or the magnets, such as a steam engine or a water turbine. But essentially the dynamo consists of an arrangement whereby wires may be caused to pass swiftly and continuously through magnetic fields whereby electric currents are generated in the wires, and of arrangements for drawing off this generated electric current from the dynamo to an electric circuit. It is, perhaps, unnecessary to show that for mechanical reasons this is best accomplished by machines having a rotary motion; that is, where the moving part of the machine turns round upon a spindle; so far as theory is concerned, the result could be accomplished by a reciprocating motion, such as a shuttle.
>
> If we now assume that the dynamo is working and producing a large amount of electricity which is led out over the external electric circuit and caused to make lamps glow, turn motors and heat ranges, we know that energy is expended in these final operations, and it is reasonable to suppose what is, indeed, the fact, that a certain amount of energy will have been lost on the way. Altogether a large amount of energy in the form of electricity has been expended—dissipated entirely so far as this particular electrical system is concerned.

PRACTICALLY everyone knows that energy cannot be produced from nothing. There is a certain amount of it available upon the earth, and the utmost we can do is to convert some part of this into useful forms. We have our dynamo producing electrical energy, but the dynamo does not spin itself; it is turned by an engine of some kind which obviously does not produce electricity directly, but rather energy in the form of mechanical motion that might equally well be applied to driving a pump or a cotton mill. The dynamo merely converts this mechanical energy into electrical energy.

A fundamental law of physics is that action and reaction must be equal, and opposite in effect. Everyone knows this, but if there should be any doubt, try pushing some object that does not resist, and see if any energy can be expended. If our dynamo should be started up and caused to spin without any external driving force, or say a very feeble force such as a hand-crank, just sufficient to overcome friction, it would generate electricity, and so long as the main switch was open so that no work was done by the electricity, it would turn very well. It would merely be ready to do work, but would not be doing any. If now the switch was closed and some lamps turned on, the electric current flowing to do this work will react upon the magnetic field-drag, as it were, and tend to slow down the machine; indeed, it will slow down and stop if sufficient external force is not applied to overcome this reaction. Clearly the hand-crank will not do, and we must couple up the engine to keep the dynamo turning. Perhaps more lamps and more motors are added to the circuit, more current flows, more reaction tends to slow down or stop the dynamo, and to overcome this the engine throttle must be opened more and more to keep the dynamo up to speed. In this manner mechanical energy is applied and, by the magnetic reactive force exerted in the dynamo, it is absorbed and converted into electrical energy.

The indispensable place of the dynamo in the production of electric power may be shown by consideration of other possible means for producing electricity. There are but three available ways of producing electricity—by the energy of chemical reactions, by converting mechanical energy, and by the direct transformation of thermal energy into electricity. Of these, the latter, although a theoretical possibility, has never been practically solved. The chemical production of electricity has been and still is practiced; on purely physical grounds it is successful and reasonably efficient, that is to say, a large part of the energy of the chemical reaction may be recovered as electrical energy. However, this source is economically impracticable for general usage. The space, weight and cost of batteries, per unit of capacity, is so great as to be beyond reason. The most efficient reagents are relatively rare and costly, and are completely consumed in the process. The kind of electric current produced—a continuous uni-directional current—is technically unsuitable for modern transmission and conversion requirements, and even if it were available cheaply and in large quantities, it would need modulation to be practically useful.

On the other hand, mechanical energy is available in a variety of forms at low cost, and a technically efficient means for converting mechanical energy into electrical energy makes all of this mechanical energy available in a much more flexible and adaptable form. The dynamo is this converter, and it is, therefore, the keystone of the electrical industry and of modern power supply generally.

While Faraday's epoch-making discoveries occurred in 1831, it was not until 1862 that a "practical" dynamo, capable of producing electrical energy which could be used in arc lighting, was built. This was 61 years after Sir Humphry Davy had produced the first electric arc, and no commercial use of the arc lamp was possible until the dynamo of 1862 was produced. In this year an arc light installation was made in a lighthouse in England, and supplied with a current from a dynamo. In 1866, Sir Charles Wheatstone conceived the idea of self-exciting the fields of the dynamo, thus eliminating the permanent magnets and separate excitation. In 1870, Gramme developed a ring wound armature, which in turn was replaced in 1872 by the drum wound armature of Von Hefner Alteneck, this being the type of armature in use today.

By 1877-78 a considerable number of people were participating in the development of the dynamo. Farmer, Weston, Brush, Thomson, Houston, and many other were all playing their part. These men were responsible for the introduction of a great many different systems of street illumination by arc lights, the various systems usually being identified by the name of the man responsible for the installation. It was quickly discovered, however, that these stations installed for street lighting purposes were not on an economical basis, for the simple reason that their product, street illumination, could only be used four or five hours out of the twenty-four.

ABOUT this time the great master of them all — Thomas Edison — appeared upon the scene. He had just completed his experiments in the telegraph field and he set about "sub-dividing" the arc light so that it could be used for interior lighting. The final result was an entirely new type of dynamo known as the constant voltage dynamo for use in connection with incandescent lamps. Without this dynamo the Edison lamp, like all incandescent lamps which preceded it, would probably have remained but little more than an interesting laboratory experiment. Heretofore the arc lamp generators had operated at a maximum of 50 per cent efficiency. Edison startled the world by building, in 1879, a constant voltage dynamo with an efficiency of 90 per cent. Light's Golden Jubilee was quite as much a celebration in honor of this dynamo as in honor of the incandescent lamp.

The first commercial central generating station producing electric current by means of dynamos driven by steam engines was placed in operation on Monday, September 4, 1882, at 257 Pearl Street, New York City. The largest dynamo, of which there were six, was approximately 125 hp. As the use of electricity increased it was discovered that because of the low voltage the central station could not serve customers more than a mile from the dynamo. Had the dynamo of the early eighties remained unimproved, there would be scattered throughout our cities hundreds of small plants. And then George Westinghouse appeared on the scene.

While in Europe, Westinghouse had his attention called to the work of two Frenchmen, Faulard and Gibbs, who had developed a piece of electrical apparatus, called a transformer, which could raise or lower the voltage of a circuit. He immediately secured the patent rights and, in cooperation with William Stanley, an experimental installation was made at Great Barrington, Mass., in 1885. In Pittsburgh, by the fall of 1886, three hundred incandescent lamps were kept lighted over a line two miles long at 1000 volts. Shortly after this the first commercial lighting plant using alternating current dynamos was installed at Greensburg, Pa. The development in 1888, by Nikola Tesla, of the polyphase alternating current motor made this system complete for commercial use.

Almost immediately after the opening of the Pearl Street Central Station in 1882, plants for incandescent lighting purposes sprang up all over the country. But they encountered the same difficulties which had faced the arc lighting stations; that is, their use was limited to the hours of darkness. In 1884, Frank J. Sprague produced the first electric motor for commercial use on the Edison system, giving tremendous impetus to the central station business, since it was now possible to operate the dynamos in the power plant more or less continuously. This, however, is another story.

The first central station was equipped with 125-hp. dynamos. Central stations of today use dynamos of over 70,000 hp. each. The voltage of the early dynamo was 220 volts, while today we find 220,000 volts. The first Edison station had 59 customers; today the light and power industry has approximately 23,000,000 customers. One has only to visit the light and power station in any large city to marvel at the progress of the dynamo since the day Faraday pushed his eight-inch iron bar in and out of a coil of wire.

NOTE: The author desires to acknowledge his indebtedness to Grove Wilson for the splendid chapter on the Life of Faraday in his book "The Human Side of Science." It is one of the first works which has given this great pioneer the credit to which he is entitled. Also, he must thank the University of Pittsburgh for a series of radio lectures including the history of electricity, the dynamo, etc.

The Business of Selling Kilowatt-Hours

A Discussion of the Recent Residence Kilowatt-Hour Contest

By C. E. GREENWOOD

"WE must sell more kilowatt-hours for each dollar of investment, making our equipment work harder and steadier, and the place to sell more electric service is in the home. Domestic sales are, and will remain, the backbone of our business." Such was the pronouncement of Matthew S. Sloan, President of the Association, in his address at the last annual convention of the Association.

We have witnessed a gradual increase in the average consumption per domestic consumer since 1922. In that year the record was 359, and the sales trend has been upward until June 30, 1929, the national average was registered at 478. Some of this increase we can assign to the downward trend in rates, and the introduction of promotional rate forms. But most of the increase is the result of an awakened interest in the commercial field, exemplified by organized effort to promote electric household devices and to sell an all-round electric service, including the refrigerator, range, water heater, oil burner and other large revenue producers.

We are making a fair start in creating greater appreciation of the benefits of electricity on the part of the home-makers.

Incentives to Action

Contests have always been an incentive to action. Most of us will admit that we have needed to inject stimulation into our selling. Such a stimulant was the Residence Kilowatt-Hour Contest inaugurated by the Merchandise Sales Committee of the Commercial National Section in 1927.

The contest was open to all Class A members of our association, and prizes were offered in three classes for the greatest increase in average kilowatt-hours sold per resident customer during the calendar year 1928 over 1927. All contestants registered at N. E. L. A. Headquarters before April, 1928, the average number of kilowatt-hours sold per domestic customer in 1927. They registered again before April 1, 1929, the average number of kilowatt-hours sold per customer during 1928.

Contestants were divided into three classes in accordance with the size of their residence business as indicated by previous sales records. In Class A there were grouped those that registered an average of 451 kw-hr. or over.

Mr. Greenwood is Commercial Director of the National Electric Light Association

In Class B were grouped those from 351 to 450 kw-hr. per year, and in Class C those selling 350 kw-hr. or under at the start of the contest.

It was expressly stipulated that all current sold during the contest period must be "metered," and that all current in the reckoning must have been sold at domestic rates and for domestic purposes. "Average domestic consumption" was based on *family units* and not on *number of meters*. The eligibility rule on metering eliminated two companies making outstanding records in increase, one of 243 kw-hr. and another of 178 kw-hr. in one year.

The immediate purpose of the contest was to direct commercial thought to domestic load factor, and the increase of kilowatt-hour sales through the products of utilization. It appeared to the committee that too much attention was being paid to *volume* of sales, and the committee was confident that ultimately the contest would stimulate appliance selling and general commercial activity.

The prizes were $2,000 and $1,000 in cash for first and second prizes respectively in each group. A fund of $9,000 was raised for the purpose, contributions from electric manufacturers making possible this activity. The writer desires to express here his wholehearted appreciation for the willing cooperation of manufacturers in this notable effort of the Merchandise Sales Committee. A list of contributors to the prize fund is published on the next page.

Although a total of 156 companies registered their entries, for good and sufficient reason some did not finish and did not register results. A list of 100 competing companies with their record of achievement begins on the next page.

Prizes Awarded

Prizes were awarded in the three classes as follows:

CLASS A

First Prize: Cheney Power & Light Company, Cheney, Wash.

Second Prize: San Joaquin Light & Power Company, Fresno, Cal.

Honorable Mention: Portland Electric & Power Company, Portland, Ore.

CLASS B

First Prize: Alabama Power Company, Birmingham, Ala.

Second Prize: Western Public Service Company, Scotts Bluff, Neb.

Honorable Mention: Durham Public Service Company, Durham, N. C.; Connecticut Light & Power Company, Waterbury, Conn. (These two companies made equal record of increase.)

CLASS C

First Prize: Central Power and Light Company, San Antonio, Tex.

Second Prize: Western Public Service Company, Beaumont, Tex.

Honorable Mention: Annapolis and Chesapeake Bay Company, Annapolis, Md.; Montana-Dakota Power Company, Minneapolis, Minn.

A full transcript of what the winners say on "how it was done" cannot be recorded here, but excerpts from statements of the men responsible for the load-building effort will be of interest. Here are some of them:

"We used every method known to good electrical merchandising," said B. R. Lean, manager of the Cheney Light & Power Company, Cheney, Wash., winner of the first prize in the Class "A" group. "This included newspaper advertising, bill enclosures, bill boards, house-to-house canvas, cooperation with other merchandisers in the communities, tie-in with all national concurrent campaigns and well-paid employees. Extra bonuses were given for certain volumes of business reached. We had theater parties and banquets. 'Our Friendly Campaign' was the name given it, and this will be of far more value to us in the years to come than the

MANUFACTURERS CONTRIBUTING TO THE NATIONAL CONTEST FUND

- Acme Electric Heating Company, Boston, Mass.
- Altorfer Bros. Company, Peoria, Ill.
- American Electrical Heater Company, Detroit, Mich.
- American Ironing Machine Company, Chicago, Ill.
- Apex Electrical Manufacturing Company, Cleveland, Ohio
- Automatic Electric Heater Company, Chicago, Ill.
- Automatic Washer Company, Newton, Iowa
- Bryant Electric Company, Bridgeport, Conn.
- Chicago Flexible Shaft Company, Chicago, Ill.
- Edison Electric Appliance Company, Inc., Chicago, Ill.
- Electric Household Utilities Company, Chicago, Ill.
- Electric Vacuum Cleaner Company, Cleveland, Ohio
- Eureka Vacuum Cleaner Company, Detroit, Mich.
- Federal Electric Company, Chicago, Ill.
- Frigidaire Corporation, Dayton, Ohio
- Gainaday Electric Company, Pittsburgh, Pa.
- General Electric Company, Refrigeration Dept., Cleveland, Ohio
- Graybar Electric Company, Inc., New York, N. Y.
- Hamilton Beach Manufacturing Company, Racine, Wis.
- Handel Company, Meriden, Conn.
- Hoover Vacuum Cleaner Company, North Canton, Ohio
- Kelvinator Corporation, Detroit, Mich.
- Kitchen Aid Manufacturing Company, Troy, Ohio
- Landers, Frary & Clark, New Britain, Conn.
- Liberty Gauge & Instrument Company, Cleveland, Ohio
- Lightolier Company, New York, N. Y.
- Lindemann (A. J.) & Hoverson Company, Meriden, Conn.
- Manning Bowman Company, Meriden, Conn.
- Miller Company, Meriden, Conn.
- Oil Heating Institute, New York, N. Y.
  - Bryant Steam Corporation, Peru, Ind.
  - Cleveland Steel Products Company, Cleveland, Ohio
  - Electrol, Inc., St. Louis, Mo.
  - International Burners Corporation, New York, N. Y.
  - May Oil Burner Corporation, Baltimore, Md.
  - McIlvaine Burner Corporation, Evanston, Ill.
  - Minneapolis Honeywell Regulator Co., Minneapolis, Minn.
  - Petroleum Heat & Power Company, Stamford, Conn.
  - Preferred Oil Burners, Inc., Peoria, Ill.
  - Silent Automatic Corporation, Detroit, Mich.
  - Timken Detroit Company, Detroit, Mich.
- Radio Corporation of America, New York, N. Y.
- Robeson Rochester Corporation, Rochester, N. Y.
- Rutenber Electric Company, Marion, Ind.
- Swartzbaugh Manufacturing Company, Toledo, Ohio
- Syracuse Washington Machine Corporation, Syracuse, N. Y.
- Walker & Pratt Manufacturing Company, Boston, Mass.
- Waters-Genters Company, Minneapolis, Minn.
- Welsbach Refrigeration Company, Gloucester City, N. J.
- Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- Williams Oil-O-Matic Heating Corporation, Bloomington, Ill.

success of this one year in building a load. Friendliness did not only apply to the public, but we instructed our employees to meet competition in a fair and friendly way, regardless of the method used by competitors. The idea was to sell the company first and then the appliances that the company's name was back of and which in time to come they were compelled to give service."

The Cheney Light & Power Company promoted the complete line of electric appliances, including ranges, water heaters, ironers, refrigerators and radios. They did not forget to increase candle power per socket. A special package of lamps was made up and sale was increased on the higher wattage lamps.

"In no case did we cut the price to make a sale," said Mr. Lean, "not even in competition, as we felt our customers must have the confidence that they were not buying an inferior article."

We asked A. B. Collins, manager of the Merchandise Sales Division of the Alabama Power Company, Birmingham, Ala., winner of the first prize in the Class "B" group, "how it was done." "In brief," he said, "definiteness was given to the contest by the adoption of a slogan and popularization of it throughout the company; an ample selling plan was developed to tie-in directly with the contest, and then load building appliances were featured through intensive selling campaigns." From which we concluded that the record was not of an individual or a department, but a company record established with support from Thomas W. Martin, chief executive of that company down to the office boy.

The exhibit of the Alabama Power Company, showing its numerous printed bulletins, forceful and overflowing with enthusiasm, was an outstanding feature. And best of all, they are off again for another record without any national contest. They are out for "One More Kilowatt-Hour Per Day."

Again we find executive support and complete employee support in the selling program of the Central Power & Light Company of San Antonio, Tex., winners of the first prize in Class "C." "The Commercial Department prepared a booklet which puts the district managers in the position of being respon-

STANDING OF 100 COMPANIES
RESIDENCE KILOWATT-HOUR CONTEST

Class "A"

Rank	Name of Company	State	Kw-hr. Consumed per Customer		
			1928	1927	Increase
1.	Cheney Light & Power Co.	Washington	686.00	491.00	195.00
2.	San Joaquin Light & Power Corp.	California	724.00	625.00	99.00
3.	Puget Sound Water & Light Co.	Washington	709.00	614.00	95.00
4.	Portland Electric Power Co.	Oregon	852.95	759.80	93.15
5.	The Washington Water Power Co.	Washington	745.00	663.00	82.00
6.	Michigan Electric Power Co.	Michigan	412.00	331.00	81.00
7.	Southern California Edison Co.	California	519.00	456.00	63.00
8.	Commonwealth Edison Co.	Illinois	582.00	537.00	45.00
9.	Union Electric Light & Power Co.	Missouri	539.00	494.00	45.00
10.	Western New York Gas & Elec. Co.	New York	494.00	451.00	43.00
11.	The Ohio Public Service Co.	Ohio	515.63	472.99	42.66
12.	Consolidated Gas, Electric Light & Power Co.	Maryland	544.70	506.20	38.50
13.	Kansas City Power & Light Co.	Missouri	551.38	513.00	38.38
14.	The Milwaukee Electric Railways & Light Co.	Wisconsin	502.10	469.30	32.80
15.	West Texas Utilities Co.	Texas	543.00	525.00	18.00
16.	Truckee River Power Co.	Nevada	638.09	620.20	17.89
17.	Penn Central Light & Power Co.	Pennsylvania	476.00	464.00	12.00

Standing of Companies in Residence Kilowatt-Hour Contest (*Continued*)

Class "B"

Rank	Name of Company	State	Kw-hr. Consumed per Customer 1928	1927	Increase
1.	Alabama Power Co.	Alabama	496.00	433.00	63.00
2.	Western Public Service Co.	Nebraska	449.10	387.30	61.80
3.	Durham Public Service Co.	North Carolina	695.50	437.10	58.40
4.	Connecticut Light & Power Co.	Connecticut	447.00	392.00	55.00
5.	Southern Colorado Power Co.	Colorado	441.99	387.58	54.41
6.	Hartford Electric Light Co.	Connecticut	478.43	430.00	48.43
7.	Connecticut Power Co.	Connecticut	411.30	465.80	45.50
8.	Central Illinois Light Co.	Illinois	443.00	398.00	45.00
9.	Elmira Water, Light & Railway Co.	New York	456.00	411.00	45.00
10.	Toledo Edison Co.	Ohio	473.50	429.94	43.56
11.	Consumers Power Co.	Michigan	462.80	419.40	43.40
12.	Louisville Gas & Electric Co.	Kentucky	458.31	419.03	39.28
13.	Dayton Power & Light Co.	Ohio	484.30	445.60	38.70
14.	Savannah Electric & Power Co.	Georgia	411.50	374.83	36.67
15.	New Orleans Public Service, Inc.	Louisiana	437.82	401.18	36.64
16.	Dallas Power & Light Co.	Texas	442.90	406.30	36.60
17.	Malden Electric Co.	Massachusetts	445.13	408.90	36.23
18.	Citizens Gas & Electric Co.	Iowa	435.00	398.00	36.00
19.	Peoples Light Co.	Iowa	435.20	404.00	31.20
20.	Kansas Gas & Electric Co.	Kansas	468.00	438.20	29.80
21.	Eastern Oregon Light & Power Co.	Oregon	399.00	370.00	29.00
22.	New York & Queens Electric Light & Power Co.	New York	392.10	364.80	27.30
23.	The Electric Light & Power Co. of Abingdon	Massachusetts	473.80	448.40	25.40
24.	Northern New York Utilities Co.	New York	387.00	362.00	25.00
25.	Peoples Gas & Electric Co.	New York	388.00	362.00	24.00
26.	Houston Lighting & Power Co.	Texas	469.00	446.00	23.00
27.	The Syracuse Lighting Co.	New York	422.00	401.00	21.00
28.	Gulf States Utilities Co.	Texas	372.34	352.25	20.09
29.	Lexington Utilities Co.	Kentucky	409.80	390.00	19.80
30.	Potomac Edison Co.	Maryland	394.41	375.29	19.12
31.	Iowa City Light & Power Co.	Iowa	454.00	436.00	18.00
32.	Grays Harbor Railway & Light Co.	Washington	414.50	396.62	17.88
33.	Kansas Electric Power Co.	Kansas	366.10	351.00	15.10
34.	Wisconsin Valley Electric Co.	Wisconsin	393.00	378.44	14.56
35.	St. Joseph Railway, Light, Heat & Power Co.	Missouri	410.81	399.00	11.81
36.	The United Electric Light & Power Co.	New York	391.60	382.04	9.56
37.	The Edison Electric Illuminating Co. of Boston	Massachusetts	450.00	441.00	9.00
38.	Cheyenne Light, Fuel & Power Co.	Wyoming	444.73	435.80	8.93

Class "C"

Rank	Name of Company	State	1928	1927	Increase
1.	Central Power & Light Co.	Texas	415.00	256.00	159.00
2.	Western Public Service Co.	Texas	367.08	263.86	103.22
3.	Annapolis & Chesapeake Bay Power Co.	Maryland	431.00	331.00	100.00
4.	Montana Dakota Power Co.	Minnesota	398.37	313.83	84.54
5.	Mississippi Power & Light Co.	Mississippi	399.00	316.44	82.56
6.	Harlem Valley Electric Corp.	New York	394.00	322.00	72.00
7.	South Georgia Power Co.	Georgia	363.90	292.10	71.80
8.	New York State Gas & Electric Corp.	New York	322.00	261.00	61.00
9.	Western Light & Power Co.	Kansas	271.74	216.22	55.52
10.	Danbury & Bethel Gas & Electric Light Co.	Connecticut	359.20	309.20	50.00
11.	Central Hudson Gas & Electric Corp.	New York	369.00	319.00	50.00
12.	Northwestern Public Service Co.	South Dakota	343.72	395.18	48.54
13.	Central Illinois Public Service Co.	Illinois	366.02	317.67	48.35
14.	Bristol Gas & Electric Co.	Virginia	370.88	323.30	47.58
15.	Weymouth Light & Power Co.	Massachusetts	355.00	308.00	47.00
16.	Wisconsin Power & Light Co.	Wisconsin	388.40	342.00	46.40
17.	Randolph & Holbrook Power & Electric Co.	Massachusetts	303.00	258.00	45.00
18.	Attica Electric Co.	Indiana	311.70	267.70	44.00
19.	Citizens Light & Power Co.	Michigan	356.00	312.00	44.00
20.	Utica Gas & Electric Co.	New York	366.40	346.20	40.20
21.	Ohio Edison Co.	Ohio	358.50	321.00	37.50
22.	Public Service Co. of New Hampshire	New Hampshire	303.30	266.00	37.30
23.	Cumberland County Power & Light Co.	Maine	379.80	343.00	36.80
24.	Southern Cities Power Co.	Tennessee	310.10	273.37	36.73
25.	Narragansett Electric Co.	Rhode Island	374.99	348.70	36.29
26.	Clinton Gas Light Co.	Massachusetts	347.60	312.60	35.00
27.	Potomac Light & Power Co.	West Virginia	348.57	314.11	34.46
28.	Columbus Electric & Power Co.	Georgia	368.08	335.48	32.60
29.	Kentucky Utilities Co.	Kentucky	281.00	249.00	32.00
30.	New York Power & Light Corp.	New York	366.00	335.00	31.00
31.	Southwestern Light & Power Co.	Oklahoma	295.90	264.90	31.00
32.	Molalla Electric Co.	Oregon	259.00	229.00	30.00

sible for their district doing its share toward winning high honors for the company," wrote J. R. McCoy, manager of the Commercial Department. "The plan went down through every employee and at the regular monthly meetings the contest was called to their attention. Then there were scheduled campaigns on ranges and other load builders, with three cooking schools held each day throughout the year. A feature of these schools was the education of present users in the proper use of their electric ranges, this work being done by our Home Service Department."

The Central Power & Light Company likewise increased its lighting wattage by the organized selling of 60-watt lamps. "Consistent selling of electric devices with electric service was stressed, and competition within the organization really accomplished results."

So with other winners. The San Joaquin Light & Power Company started their local campaign with an objective of 100 kw-hr. increase, and finished with 99. A. M. Frost and his commercial departments conducted fairs, cooking schools and continuous demonstrations of electric devices for the home. During 1928 there were sold 1600 ranges and over 1000 water heaters were added to the lines.

Western Public Service Company at Beaumont, Tex., likewise mobilized the selling power of the employees and used every constructive promotional effort. Here the "district representative" plan is in operation. In the report submitted by J. G. Holtzclaw, it is interesting to note that nearly 200 houses within reach of the distributing system, a large majority of which were occupied by negroes, were wired during the year. Certainly this is an indication of intensive selling.

Another Stone & Webster property, Western Public Service Company of Scottsbluff, Neb., was the winner of a prize, and applied sales programs which paralleled somewhat those of the sister company in Texas. "Every man in the company was inspired with load building interest," said M. T. Anthony, the sales manager. "We knew they were able to do the job if the responsibilities of building the company's load were explained to them. The employees were rated on the point system. It is of unusual interest that a cashier won that contest, his sales of merchandise approximating $13,000. Contests, sales campaigns and educational mediums played an important part in upholding continued interest."

Meriting special mention, is the practice of all successful companies in promoting the ultilization of electric appliances in the home, with equal force with the selling of the products them-

Standing of Companies in Residence Kilowatt-Hour Contest (*Concluded*)

Rank	Name of Company	State	Kw-hr. Consumed per Customer 1928	1927	Increase
33.	Gardner Electric Light Co.	Massachusetts	309.40	280.50	28.90
34.	Northern Indiana Power Co.	Indiana	317.50	292.40	25.10
35.	Edison Electric Illuminating Co. of Brockton	Massachusetts	355.60	330.90	24.70
36.	Empire District Electric Co.	Missouri	304.00	280.00	24.00
37.	Missouri Gas & Electric Service Co.	Missouri	350.00	326.00	24.00
38.	Wabash Valley Electric Co.	Indiana	299.50	277.90	21.60
39.	Northern Virginia Power Co.	Virginia	353.95	333.27	20.68
40.	Public Service Co. of Colorado	Colorado	350.40	329.80	20.60
41.	Cambridge Electric Light Co.	Massachusetts	349.00	330.00	19.00
42.	Plattsburg Gas & Electric Co.	New York	311.00	298.00	13.00
43.	Staten Island Edison Co.	New York	353.00	343.00	10.00
44.	Southwestern Gas & Electric Co.	Louisiana	354.30	345.00	9.30
45.	South Penn Power Co.	Pennsylvania	305.33	295.61	9.72

selves. This was the dominating policy of the winners in the contest. The writer wishes he had space to bring out many other details of the highly organized selling plans of all winners and others who presented outlines of their commercial activity. It would make inspirational reading.

The advice of Henry Ford has not fallen on deaf ears. "Getting electricity into the minds of the people" is our commercial objective, in the domestic field. It is the business of selling kilowatt-hours of diversified service in the home, and in the commercial and industrial field as well. The home is our major concern. The contest was an object lesson. What has been done by a few can be done by many. The Residence Kilowatt-Hour Contest, which a group of appliance manufacturers made possible, was the spark to fire selling action. Executive support was given and employee interest was registered. Records were rolled up by those who were hitting on all six, that is, the winners

Stressed the load builders
Increased wattage of sockets
Conducted consistent campaigns
Applied effective advertising
Promoted home service
Cooperated with the dealers.

We register another successful load building activity of the Commercial National Section.

Japanese Mission Guests of Association

A GROUP of seventeen prominent officials from the Japanese electric lighting and power companies, representing public utility companies with an aggregate capitalization of approximately $500,000,000, were the guests of the National Electric Light Association at Association Headquarters, the afternoon of October 3. The mission was told of the work of the association by Secretary A. Jackson Marshall and representatives of the various departments.

The special service which is sometimes rendered by the representatives of the Headquarters' staff to members of the Association is indicated in the talk given by C. E. Greenwood, Commercial Director.

On October 2nd, at the Studios of The Miller Company, Mr. Greenwood outlined the demand for better illumination in the homes and commercial buildings of the United States, and analyzed the market for new fixtures and portable lamps and the effect of the increased lighting load on the investment efficiency of the power companies.

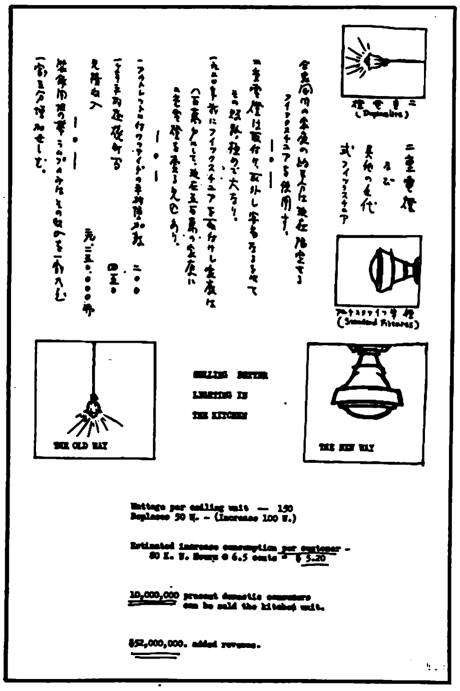
Statistical data was presented on charts, the text being printed both in English and Japanese.

Capital turnover which occurs once in approximately five and one-half years in the United States extends over six years in Japan. The Japanese have a marketing effort to perform in the selling of electricity which somewhat parallels the situation in this country.

This lighting mission, traveling under the auspices of the Tokyo Electric Company and the International General Electric Company, is in the United States to study modern lighting installations and methods, and the administrative and engineering problems of the central stations which supply electricity in this country.

The personnel of the mission follows:

H. Ihara, Micgodo Electric Company; T. Hata, Niigata Hydroelectric Company; M. Kihara, Tsikoku Rengo Lamp Company; S. Kunitome, Chuo Electric Company; U. Mori, Toho Electric Power Company; H. Miyata, Kyushu Electric Railway Company; K. Murakami, Kyushu Hydroelectric Company; R. Musha, Keijo Electric Company; J. Nishida, Osaka Lamp Company; K. Ogata, Kumamoto Electric Company; B. Sakaguchi, Hiroshima Electric Company; F. Sato, Osaka Electric Power Company; K. Sugiyama, Tokyo Electric Light Company; K. Takecki, Iyo Electric Railway Company; T. Yamashita, Osaka Municipal Electric Department; S. Tejima and H. Sakai, Tokyo Electric Company.


(Dependable)
(Standard Fixtures)
THE OLD WAY
THE NEW WAY

SELLING BETTER LIGHTING IN THE KITCHEN

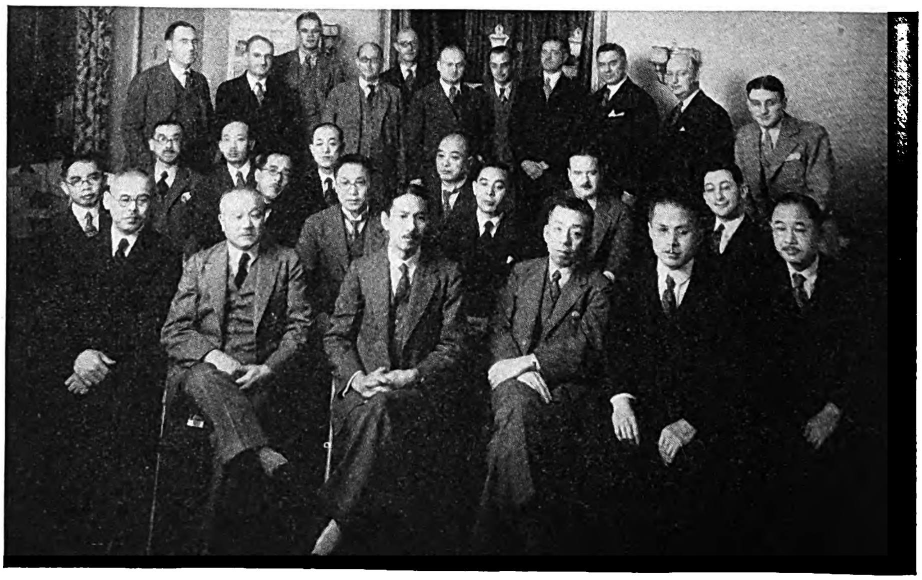
Wattage per ceiling unit — 150
Replaces 50 W. – (Increase 100 W.)

Estimated increase consumption per customer - 80 K. W. Hours @ 6.5 cents = $5.20

10,000,000 present domestic consumers can be sold the kitchen unit.

$52,000,000. added revenue.

Statistical data in English and Japanese



The Japanese Mission

Cheaper Wiring

A Matter of Vital Concern to the Industry and the Public

By H. S. Bennion

I HAVE been asked to address you on the subject of "Cheaper Wiring." In doing so I shall assume that you desire to hear something of the economic side of house wiring. As inspectors you are frequently having to decide the probable degree of acceptance by the purchasing public of proposed or adopted safety provisions which will in some measure affect the cost of house wiring. On this account you are interested in the economics of wiring.

I shall assume that fundamentally it is a matter of indifference to you whether houses are wired cheaply or very expensively, just as it is not the concern of building inspectors whether a prospective householder decides to build a five thousand dollar or a twenty-five thousand dollar house, these being matters for the purchasers individually and collectively to decide for themselves.

I believe that this collateral interest in the cost of wiring is a matter of legitimate concern to the inspectors, as experience has amply shown that excessive requirements inevitably lead to evasions of one kind or another, usually, of course, after the initial installation has been completed and accepted. It is generally true that excessively burdensome requirements lead to disregard for the necessary along with the unnecessary requirements. There is a fairly definite limit of public tolerance of laws and regulations of all kinds.

What We Mean by Cheapness

Now with respect to cheapness, we must define what we mean. It is fundamental that specific cheapness is desirable in itself; all commodities and all services without exception are more desirable at a lesser cost than they would be at a greater cost. Cheapness, of course, must not mean shoddiness or failure to meet necessary provisions for safety, but cheapness meaning low cost need not mean lack of safety, just as high cost does not mean safety.

All groups of commodities useful to our civilization have wide variations in degree of fineness and cost within their groups, and all of them that survive competition have definite utility. There is, of course, the familiar example of the motor car where both second-hand Fords and custom-made foreign cars each have an approprite and useful place in the market, although with a cost ratio between the cheapest and costliest of perhaps one to two hundred. There are, of course, all of the grades in between these extreme limits. There are innumerable other examples. Costly fabrics are appropriate for our Sunday clothes, but denim is not only good enough but actually better for working in the fields, and so examples might be multiplied indefinitely. It may be said that engineering materials do not follow the same laws on account of the restrictions imposed by technical requirements, and this is true, but only in degree. Even steels used for construction purposes will vary in their cost ratio by about ten to one. Nevertheless, the principle prevails that the cost of an article should be no more than that appropriate for its intended use, and the mere fact that something more expensive exists does not necessarily make it desirable for uses where cheaper things are appropriate.

Major Bennion is Director of the Engineering Department, N. E. L. A. This address was made before the Northwestern Section of the International Association of Electrical Inspectors, at Vancouver, B. C., September 11, 1929

On the whole, it seems to me that anyone who knew this and also knew that electric house wiring must suffice for various services, from the heaviest and roughest industrial plants or luxurious places to the most modest dwellings, would normally expect to find a rather wide range of types and unit costs, perhaps of the order of ten or fifteen to one. The reverse of this condition, whereby one or a few types attempt to serve such diverse ends, should be regarded as the extraordinary situation.

In the case of electric wiring, it is certainly desirable, from the point of view of all concerned in any degree with the electrical industry, that building owners should be persuaded to spend as much as possible upon their electrical installations. In the nature of things, this must be a matter of persuasion, since the owner has it completely in his hands to do as he pleases about it; that is, to put in a small amount of very expensive wiring or much more of less expensive wiring, or in the case of a structure already built, to decide to get along with what he already has. The question, therefore, is whether he shall use expensive wiring, in which case he will inevitably use as little as possible, or at least he will get less in terms of outlets for his limit of expenditure, or whether, on the other hand, he shall employ an inexpensive type of wiring and install a great deal of it.

Manufacturers' and Contractors' Interest

So far as the trade is concerned, it should make very little difference to manufacturers, since they would sell about the same money's worth in either case, although there may be a slight preference for the cheaper articles in harmony with the general trend of American commerce toward the distribution of great quantities of commodities at low unit costs.

It should be a matter of indifference to the contractor since his profit is proportionate to the total cost of the job, and the choice is in favor of labor since with less costly types for the same total amount of money expended upon wiring the amount devoted to labor will be proportionately greater. From the point of view of the central station there is, of course, no question since their whole commercial program depends upon increasing the means by which their customers may freely use electric power.

It is especially appropriate at this meeting to consider the relation of the inspector to this matter, and it appears to me that from the point of view of his daily work and the results that he hopes to achieve there can be no question as to his choice. Practically all of the evils with which inspectors are concerned are those due to the abuse of wiring and not to the proper use of any approved methods or materials. People put pennies in fuses or bridge them, not from sheer malice, but because they are overloading circuits. The obvious cure for this is to provide more circuits, heavier circuits and more outlets. Flexible cords and excessively long portable cables are draped all over houses and even extend from room to room or, as it has been reported, even from floor to floor. The remedy again is in the provision of additional outlets so that it will actually be easier to plug the connection into a proper receptacle than to drag cords all over the place.

The Remedy

The remedy for these and many other evils traceable to the same source lies in the installation of house wiring that is complete for modern necessities in the use of electricity. It is a considered view of the executives of electricity supply companies and their sales experts that this will not be accomplished with the more expensive forms of wiring now on the market. This is undoubtedly an impartial and dependable verdict since electricity supply companies would have everything to gain if new outlets could be installed by means of such types of wiring, and no one would be happier than they to see it done. It may be taken as a fact then that the truly adequate wiring of new houses and the modernizing of the wiring in existing installations definitely require means for wiring at much lower unit costs than those available in many localities. This means not only the continued recognition of the simpler forms of wiring that have been shown by experience to be satisfactory, but it means as well the development of new methods of wiring that will still better meet the requirements. In addition to this it is of the utmost importance that every means for shaving costs in all systems of wiring should be utilized.

It should be noted at this point that the views of the central station executives are positive rather than negative. They are not opposed to any recognized commercial product and they desire to promote the use of all of them. They hope for the installation of every foot of rigid conduit that the traffic will bear, and all the armored cable and metal surface raceway as well. In addition they desire to promote the free use of all other systems of wiring, those that are known as well as those that have yet to be developed, upon the single condition that they comply with the indispensable provisions for safety.

Our executives feel it to be essential that there shall be some systems to supply the demand for low cost wiring. The view has been expressed from time to time in various quarters that there were already too many kinds of wiring. This has little or nothing to do with codes or inspectors since it is obvious that any systems complying with requirements must be recognized although there be scores of them. It has economic importance certainly but the remedy is also economic, namely, that diversity of this kind will cure itself by the inevitable victory of the best systems, that is those having the best utility.

The Matter of Safety

It may reasonably be asked what objections there are from the point of view of safety to the cheapest possible forms of wiring. The only possible answer is that there can be no objections to any type of wiring as long as it complies with necessary minimum requirements for safety. It is of the utmost importance to observe that these shall be minimum requirements. It is entirely possible that some forms of wiring may have additional factors of safety which render them valuable for certain special applications, but unless the degree of safety that they afford is indispensable in a particular situation, why make the expenditure? The mere existence of exceptionally rugged types of wiring, such as rigid conduit, does not imply that their use is necessary or even desirable in situations where the particular requirements for such ruggedness do not exist, and it is in this respect that amateur attempts at drafting regulations most frequently fail. There is a natural tendency to play on the safe side and to make normal those exceptional requirements that may actually not be required one time in a thousand.

At this point it may be appropriate to examine the records to see if possible what circumstances create a moral obligation for new or special provisions for safety, that is to say, provisions in excess of those which we have got along with in the recent past. If any types of wiring or any established safety methods are deficient it should appear plainly in the record. In discussing this I shall confine my remarks to the hazard of circuits less than 150 volts to ground because this has appeared to be the focus of controversial opinion, some saying that there were great numbers of people being killed at this voltage and others denying it.

When this subject was debated recently, it was revealed that no one really knew anything about it. It is an actual fact that sincere men were urging measures which would have had profound effects upon a great industry upon a basis of rumors and conjectures, when upon investigation it appeared that they had no positive knowledge whatever of the prevalence of the hazard; indeed, such knowledge did not exist. Various interested parties thereupon undertook to collect the necessary statistical and other information and among these was the N.E.L.A. I shall, of course, refer to the investigations of the N.E.L.A. which, although they are not nearly as complete as they will be in the course of the year, and not complete enough to justify the public announcement of even preliminary data, are still interesting enough in view of this occasion for me to venture some personal and informal estimates.

I find from examination of the records for the past five years from a substantial fraction of the population where electricity is available in the United States that it is probable that the general rate for authentic fatalities at less than 150 volts to ground will be much less than one fatality per million inhabitants per annum, and that there is no indication of a systematic increase in the rate. This figure is the total for all authentic fatalities established from public official sources at this voltage, except public utility employees working upon public utility plant (and I may say parenthetically that these were very few in number at this voltage). It is, therefore, a gross figure without reference to technical code questions.

Application of Codes

Now as to the application of the codes, I find the state of affairs about as follows. About one-quarter of the cases were those of persons making repairs or tinkering with electrical devices, or doing unusual and unpredictable things, some of them astonishing in their novelty, and all quite beyond the ability of any code to anticipate. My impression is that nearly half of all the cases will be accounted for by the persons killed in bath tubs and those in boiler drums or the equivalent. It is quite evident that ordinary metallic contacts are not fatal at this voltage, and equally evident that dampness and moisture, in the ordinary sense of those words, are not hazardous.

It is my opinion that, aside from the bathtub and boiler group, and the "non-code" group, there will be in the whole country a residue of five to ten cases annually where, if all of the circumstances were known in advance it is conceivable that code provisions could be devised that would prevent them. But—these residual cases appear to have no features in common; they do not repeat themselves, and there seems to be little relation to any generalized methods for safety, such as grounding, or isolation or insulation. It has never been contemplated, and it is not now conceivable that the codes can provide for the individual case, however unfortunate that may be.

This exhibit, if it is confirmed by more complete data, and it is my conviction that it will be, is a splendid one for the art of house wiring. It means that the personal hazards inherent to the use of electricity at lamp voltages are negligible save for one or two identifiable weaknesses and it is to be borne in mind that this exhibit applies to the art as it stands—to the very oldest as well as the newest installations, to the lamp cord method of wiring and all of the other variants unknown to the code, and to the shoddiest and most disreputable appliances; a little education should cure most of this trouble. Under these circumstances does it not appear absurd to denounce systems showing a modest departure from some of the conventional ideas, as a breakdown of indispensable code standards?

The "Standard" in Homes

Almost any real system of wiring would be an improvement on the lamp cord method of wiring, the one system now "standard" in American homes. In general, the mere fact that a new system, or a modification of an old system is openly and frankly advocated by any competent persons should bias you in its favor, because as inspectors you know well that extra-code, uninspected and indefensibly bad wiring is actually going in all about you continually, and you know moreover that even reinspection, where it is practised, has not proven effective to abate these practices.

I am, as you see, asking for an open mind when you meet and deal with new methods and new modifications in old methods. That you will meet and deal with them is a certainty. Some are already in the field although not in the code and you know about them. Others will appear, and whether they appear first in the code or in the field will depend very largely, almost wholly, indeed, upon the ability of the electrical inspectors of the country collectively to deal on engineering lines with the appearance of these new methods and materials for wiring. The problem when these appear will be whether you inspectors will elect to compare them with the special merits of existing wiring systems or whether you will view them as possible eliminators of the housewife's effort to solve her wiring problems.

I am predicting the advent of new, simpler and probably cheaper wiring methods not altogether because I have information about it. I have some information of new developments being tried out and of others underway, but I am not at liberty to reveal it in detail at this time. But if I did not have such information I could speak with almost equal confidence, for it is obviously in the order of things. Electric power is cheap and getting cheaper, it is now a familiar, commonplace thing, the demand is in healthy shape and is constantly being stimulated by new applications that are useful and attractive to nearly everyone—central stations and dealers do their utmost to persuade the people to use more and more electricity. House wiring is the neck of the bottle. No less an authority than the chairman of our Commercial National Section has so stated. Can anyone believe that this particular art will remain unchanged, with every thing changing about it? Consider the manner in which hard roads followed the motor car, the changes following the radio, the speed with which cinemas have been re-equipped since the advent of talking pictures, and ask whether any technical system can withstand the pressure of a new necessity. Each of these, and many others readily recalled, meant the scrapping of plant and very good plant, of ideas and prejudices.

Change Must Come

Of all things in the electrical world, why should it be expected that materials or methods that were sufficient ten years ago, or five years ago, should be sufficient today solely in the house wiring art? It is not true of prime movers or electrical machines, or switches, or transmission and distribution lines. It is not true of our ideas concerning the utilization of power or of lighting. Especially it is not true of the social and economic aspects of the electrical industry for what was a luxury has become a necessity and will be so regarded in all of its aspects. Is it not evident that this must profoundly affect all of our ideas concerning house wiring?

My purpose in coming here has been to talk with you frankly about the things that are taking place in the house wiring field and to ask your sympathetic aid to the electricity supply companies in working out the code problems with which they are being confronted in their dealings with the public. We want you to feel confident that we have the safety of the lives and property of our customers at heart, and we wish to assure you that we will seek the experience of trial tests and the advice of engineers of high attainments in the electrical field before proposing for general adoption important departures from previous practice. We feel assured you will consider these matters with an open mind and judge proposed changes on their engineering merits and in accordance with facts.

Correction

A REGRETTABLE error occurred in the makeup of the article, "The Flexible Cord Problem," by Arthur P. Good, page 661, October issue of the N. E. L. A. BULLETIN. The concluding three paragraphs of the article were transposed so that they appeared near the middle of the article, while the two concluding paragraphs were again repeated in their proper position.

The following changes should be made for a correct reading:

Delete last two paragraphs of article and transpose, in their place at the end of the article, the three consecutive paragraphs beginning with the last paragraph in center column, page 662 (first line of which reads "All of these wiring jobs that we have") and continue through the next two paragraphs in third column, page 662 (last line reads "the carpet, 25 feet to the new radio set").

Amplifier Article

(*Continued from page* 703)

purpose of merchandising electrical appliances, meaning increased comfort in the home and increased consumption for the light and power company. Forgotten, or ignored, is the fact that increased consumption is almost invariably followed by a reduction in rates, which under regulation means that the consumer and not the company gets the benefit of the results of this advertising, if the company already is earning a fair return. The company is damned if it does not try to increase consumption so that it can reduce rates; or it is damned if it adopts ordinary business methods in an attempt to increase consumption so that it can reduce rates. In other words, no matter what it does, it is wrong, and should not even be allowed the opportunity to prove, by the publication of solid economic and social facts, that it is right, because this might create a favorable attitude on the part of public opinion.

In fact, the position in which the light and power industry finds itself today is reminiscent of that famous story from Don Quixote, where the lord of a great land set up a high court at the end of a bridge which crossed a river bounding his domain. To this court he gave instructions along the following lines: Whosoever seeks to enter the country and tells the truth about his business, then shall he be allowed to go about that business. But if he tells a falsehood, then shall he be hanged by the neck until dead. And it so happened that a young man sought to enter the country and was asked by the court as to his business there. "My Lords," he replied, "I have come to be hanged."

The electrical industry is meticulously truthful in the material it sends out for the information of the public, but it has no intention of being hung, and a vast majority of the American public have no desire to see it hung, nor will they permit it to be hung, however pleasing that spectacle might be to those whom Sir Ernest Benn calls "the incompetents, the parasites, the passengers, the incapables and the pauper-minded."

Changes in Format and Method of Handling N. E. L. A. Committee Reports

By A. JACKSON MARSHALL

Secretary, National Electric Light Association

EDITOR'S NOTE: It is believed that a broader understanding of what the Association offers to the individual employees and the officers of member companies, as well as to the companies, can be gained through a better knowledge of the character of N. E. L. A. committee work and the service operation which makes reports of the committee available to every person in the industry. This article is the first of a series which will describe some of the services offered through the cooperative work of the Association's members. A description of the mechanics involved in the production of committee reports will constitute the next article in this series. It will appear in an early issue of the BULLETIN.

IN keeping with the need for presenting N.E.L.A. committee reports in the most useful form for the reader, and as economically as practicable, the style of presentation has, from time to time, undergone changes. Beginning with the new administrative year, several improvements have been made in the format of the reports. Such changes have been made with these objectives in view:

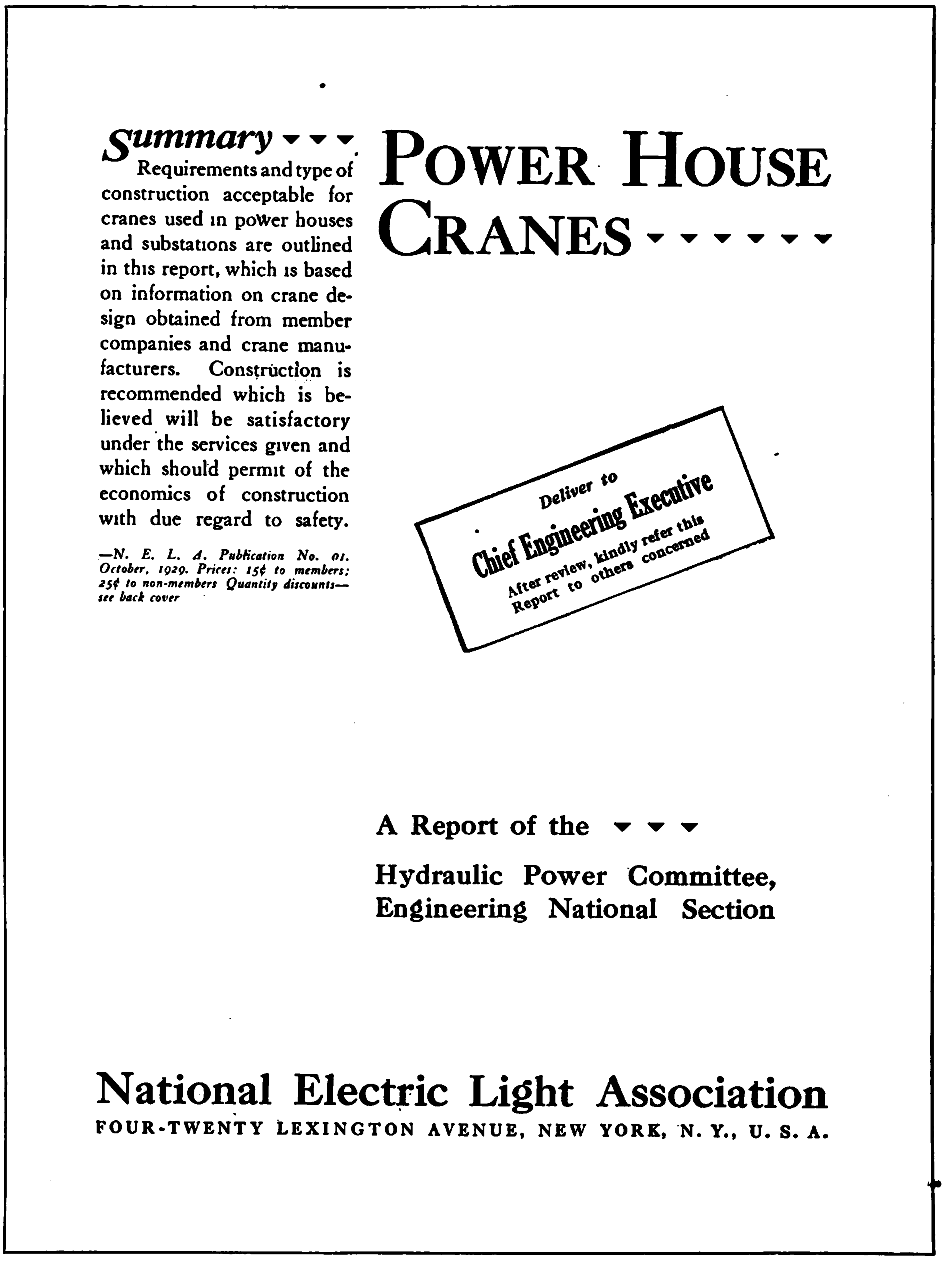
1. Greater ease in reading
2. Presentation of scope of report on cover so that it may be quickly assimilated
3. Greater flexibility in handling text and illustrations
4. A design in keeping with modern typographical trends
5. Greater economy of production.

In addition to the title of the report, there appears on the front cover a brief summary, so that the busy executive may determine at a glance the nature of the report, and, after perusal, direct it to others concerned in his organization as suggested on the colored sticker. Other information, including the name of the committee that prepared the report, the publication number, date of publication and prices, also appears on the cover.

To facilitate quick perusal of the report, a complete contents is listed separately on the inside front cover page. The report proper begins on the first right hand page. The body of the report is set in an easily read (Caslon) type face on a 3-column page, similar to the page on which this is printed. The narrow column is more easily read than the wider column used formerly, and it also presents the following additional advantages: (1) Greater flexibility in the size and arrangement of illustrative and tabular matter; (2) A reduction in the number of pages required for printed reports, which consequently curtails the growing size of the Association's annual proceedings; (3) Greater economies in publishing costs.

The body of the report concludes with the committee (and subcommittee) personnel. On the back cover is printed a price list of current publications of the particular section concerned.

Formerly it was the practice for committees to prepare an annual report which was printed in pamphlet form. The report was presented by the committee chairman at the annual convention of the Association and copies were distributed to delegates. This method, however, had many disadvantages, chief among which were the time consumed in presenting the reports at the various meetings of the convention, and the



Summary ▾ ▾ ▾

Requirements and type of construction acceptable for cranes used in power houses and substations are outlined in this report, which is based on information on crane design obtained from member companies and crane manufacturers. Construction is recommended which is believed will be satisfactory under the services given and which should permit of the economics of construction with due regard to safety.

—N. E. L. A. Publication No. 01. October, 1929. Prices: 15¢ to members; 25¢ to non-members Quantity discounts—see back cover

POWER HOUSE CRANES ▾ ▾ ▾ ▾ ▾ ▾

Deliver to
Chief Engineering Executive
After review, kindly refer this
Report to others concerned

A Report of the ▾ ▾ ▾

Hydraulic Power Committee,
Engineering National Section

National Electric Light Association
FOUR-TWENTY LEXINGTON AVENUE, NEW YORK, N. Y., U. S. A.

Typical cover page of newly designed N. E. L. A. Committee Reports loading up of delegates with copies of reports which were not read at the time, and which, in many instances, were never seen by the individual after the convention. The method likewise limited the committee to the one annual report which had to be published by a definite date prior to the convention. Naturally, this brought an excessive peak load production which usually results in inaccurate presentation and high costs.

Now, the regular procedure in presenting committee reports provides for the preparation of one or more reports by a committee during an administrative year, and the prompt dissemination of this information to the industry. Thus the compilation of important data by a committee during the administrative year can immediately be made available to the industry, rather than holding such information for an annual report at the close of the administrative year as was formerly the case.

During the past several years, such reports were termed "Serial Reports" to distinguish them from the "Convention Reports" previously published. This procedure is now well enough established, so that it has seemed advisable to discontinue the use of the word "Serial" in connection with committee reports, inasmuch as in most cases each report is complete in itself and is not one of a series. Where a subject may be divided into two or three reports, as is sometimes the case, the first part of the report is published as Part I, the second as Part II, etc. The desirability of this presentation as compared with the "Convention Report" method, is self-evident, the chief advantage being that the compilation of important data is placed in the hands of members at the earliest possible moment.

Because past experience has proved the futility of attempting to keep an accurate report mailing list of individual names, reports when published have been mailed to each member company with a sticker on the cover stating that the report is for the attention of the department head most concerned; or the chief executive, in cases of Special, General and Public Relations Section committee reports. Under the practise being inaugurated with this administrative year the reports will be mailed to member companies with a sticker directing the report to the company's Accounting, Engineering, or Commercial chief executive, and in case of Special, General and Public Relations Committee reports, to the company's chief executive officer. The color of the sticker in each case corresponds to the color given the various national sections by the Secretary's office at Headquarters; i.e., blue for accounting; pink, engineering; red, commercial; yellow, public relations; green, special and general committees.

The practical and useful information on all phases of the electric light and power industry made available in N.E.L.A. committee reports offers the men and women of the industry a most valuable service which many are learning to use for their own benefit and that of their company.

During the past administrative year, there were published 75 committee reports, totalling more than 2000 printed pages, and dealing with accounting, commercial, engineering, public relations and many other subjects. The distribution to member companies only, exclusive of standing and other orders, amounted to more than 250,000 copies.

Believing that the value of this work in the final analyses must be measured by the importance of these reports to the individual men and women in the industry, a recent request was made by the Executive Secretary of the Southeastern Division, C. M. Kilian, for individual comment on their value, which brought a gratifying response. Abstracts from a few of the replies are appended. There were many others which lack of space prevents reproducing here.

No doubt there are many employees and executives of member companies as well as others who may not be well acquainted with this phase of the Association's work, so it seems pertinent also to mention here a fact or two concerning the character of this service.

For the collection and assembly of information and data on company operating methods, practices, equipment and new developments, the various national committees of the Association without a doubt have at their command the best qualified men of the industry. The fact that member companies delegate to active participation in N.E.L.A. committee activities, the men and women in their organizations who have shown exceptional merit in their selected fields of endeavor, is indicative of the importance the industry attaches to this work. This collaboration of expert talent, representing as it does all sections of the country, assures a comprehensive portrayal of the latest trend and developments in specific fields of the industry, which is both accurate and authoritative.

Comments on N. E. L. A. Reports

All N. E. L. A. reports which have any bearing on electrical operations of our company are passed to the particular department head interested in the particular phase of work covered in the report. In reading these reports I frequently obtain ideas which are useful in our work. I make it a practice to write memorandums to the various department heads at the time of reading these reports, and while the ideas are fresh in my mind. We make it a point to read all reports which apply to our work, and in this way keep up with the latest practices in the industry.—M. ELDREDGE, *chief engineer*, Memphis Power & Light Company.

* * *

The operations of our company are scattered over the entire State with several main offices. Value has been received from a recent report through distributing the report among our field representatives. The report, in part, dealt with a problem that has been of much importance in the past year. It is believed that the report was of value in producing cooperation between employees and coordination of their efforts in their work on this particular problem.

Reports have been of value in that they have given other companies' experiences on general problems that we were working on.

They have also brought out practices of other companies that have indicated ways of improving the existing methods of handling certain work.—J. T. FOWLER, JR., Alabama Power Company.

* * *

It would be very hard to explain or to estimate the value and benefit that we have received from these splendid reports. I will assure you that they were read with very much interest and have been very beneficial to quite a number of our employees.—T. S. MURRAY, *new business manager*, Tide Water Power Company.

* * *

During the past year I have received a number of reports which the Association has issued. These reports have been interesting to me due to the fact that a large number of them have dealt with subjects and problems which have confronted us in our daily operation.

These reports are of value as they discuss the various methods employed by the different utilities in handling typical problems. Quite often when a new problem arises, I am able to refer to N. E. L. A. Reports and get some information on how other companies have handled the same situation. This history and experience data are often quite valuable.—R. F. PENMAN, *electrical engineer*, Knoxville Power & Light Company.

* * *

We have found the N. E. L. A. Reports very interesting and helpful to us in our work, as we have used copies received and duplicated orders for several of the various subjects discussed.—WILLIAM W. CARLTON, *supt., meter department*, Southern Cities Power Company.

* * *

The benefits derived from the N. E. L. A. Reports may be summarized as a large number of small benefits rather than a few large ones. The information contained in the reports is usually in such form that the higher grade operators can readily digest same and obtain ideas which may be applied practically in their every-day work. It is felt that the greatest benefit comes to the employees of member companies in the application of information and ideas obtained from the reports.—J. H. WHITE, *superintendent of power*, Florida Power & Light Company.

* * *

Reports received from the Association have been very interesting and also valuable in more ways than one. I very often refer to N. E. L. A. Reports for information concerning operating and technical problems.

They have served to bring about a better understanding of what others are doing in the public utilities field. Putting forth an effort to absorb the practical and technical points as represented in these reports has been a wonderful help to me in utility work; consequently I feel that these reports will serve in a valuable way to all utility employees who are interested in keeping up with the progress of the utility business.—E. M. LYNCH, *supt. of meters,* Florida Power Corp.

* * *

I don't know of any source where data, reports, etc., bearing on our industry may be obtained that can be considered as comparable with the N. E. L. A. publications. These reports necessarily cover a wide range, and some, of course, are more interesting than others to the individual—the interest usually being in direct proportion to one's activity in the particular phase of our business under discussion. I find that the serial reports issued by the various committees are not only informative but educational, in that they cover the intimate problems met with in the various branches of the utility business, and being prepared by men within the industry they retain a certain amount of that intangible thing called "personal touch" that keeps one interested and wanting to know what the next subject for discussion will be.—W. L. WOOTTON, *engineer,* Florida Power & Light Company.

* * *

We received many reports from the Association, all of which were very interesting and were read by almost every engineer member of this department, and they have been helpful in many ways because these reports have given us all, I think, a somewhat broader aspect of our daily endeavors than we would have had if we had not received them.—G. J. ROEWE, *chairman, Overhead-Underground Systems Committee,* Carolina Power & Light Company.

* * *

The various reports issued by the Association are practically always interesting, particularly so if they deal with subjects with which one is immediately concerned. The experiences and new installations covering the industry have been of value in solving some problems by pointing out ways of bettering efficiencies, or by preventing duplication of unsuccessful experiments, which would be the case if we were not kept advised of the efforts of others with the problems encountered in central station work. The work involved in preparing and submitting reports is more than compensated for by the helpful suggestions and exchange of ideas that this work brings about.—J. MARSHALL JOHNSON, *asst. supt., steam station,* Nashville Railway & Light Company.

* * *

I believe that the general dissemination of knowledge gained from the operation of various systems is of great value to all those concerned in that, by profiting from the experience of others, costly experimenting and changing of methods can be minimized. I hope that the Association will continue to publish these reports as heretofore, so that information obtained and conclusions reached may be passed out to those who are not actively engaged in working up the data for the reports.—J. COLEMAN JONES, *transmission engineer,* Florida Power & Light Company.

* * *

N. E. L. A. Reports of a general nature and applicable to other businesses besides light and power companies have been of value to us. We always look through every report, and if there is anything that we can use, it is kept. To be specific, last week the report on the "Suggesstion Systems" to be used in accident prevention was sent to our plant superintendent for consideration.—W. M. CLARK, Bessemer Galvanizing Works.

* * *

N. E. L. A. Committee Reports are of value in that we can pass on to various members of our organizations the opinions of committees or men who have specialized in some particular subject.

I think that their greatest value lies in their usefulness to the men who do not get an opportunity to attend conventions and committee meetings.—J. A. LONGLEY, The Tennessee Electric Power Company.

* * *

In these days of rapidly changing methods and conditions, if one is going to keep up with the procession, it is very essential to get the ideas of other people in the same line of work, who are meeting the same problems and have to devise new methods to meet certain emergencies. The Association Reports are the main source of these new ideas and methods, and are of real value to us.—L. H. CROWELL, *comptroller,* Columbus Electric & Power Company.

* * *

It is my personal opinion that some of the reports which have been published by the Association during the past eighteen months are the best references and educational bits of literature that it has been my good fortune to study.—HAROLD W. KING, *district manager,* Sangamo Electric Company.

* * *

I maintain in my office a file of N. E. L. A. Reports which are available to the various members of the organization, and every one of them has been of interest to somebody. They are valuable as reference and keep us up-to-date.

I hope you will continue your plan of sending these reports out, and that my name will remain on the mailing list.—E. F. McLAUGHLIN, General Electric Company.

* * *

I am pleased to answer your letter relative to the good that has been derived by myself and the Department from the reports which the Association has furnished us. Reports of this nature are always interesting, and always contain some thought of value: First, because of the thorough and concise manner in which they are presented; second, because they contain the important happenings, developments, and suggestions in which we are vitally interested; and third, because they keep us in touch with, and better enable us to work mutually with our sister companies in rendering a better service.

We appreciate very much the assistance received by way of the reports you have furnished.—L. N. WILSON, *Supt. of Meters,* Knoxville Power & Light Company.

* * *

I read with a great deal of interest all the reports of the N. E. L. A. and receive considerable information from them that can be used in our work here.—J. S. SUTHERLAND, *Asst. Mgr. Mdse. Sales Division,* Alabama Power Company.

* * *

I consider the reports of the Association as invaluable in the dissemination of information concerning the industry. Among the reports which have been received, I have been particularly interested in those dealing with market and industrial development.—F. J. DODD, JR., Georgia Power Company.

A Study of Merchandising Advertising

(*Continued from page* 708)

when it was believed that the expenditure would prove most profitable. When this work had been completed, it was found that the expenditures during the first two months of 1929, were to be made on advertising for the appliances shown in the following table:

JANUARY	FEBRUARY	
Heating Pads	Heating Pads	Refrigerators
Irons	Irons	Percolators
Hair Dryers	Hair Dryers	Toasters
Kitchen Units	Kitchen Units	Vacuum Cleaners
Lamps	Lamps	Waffle Irons
Ranges	Ranges	
Space Heaters	Sewing Machines	

A definite amount was allotted to each of these appliances for each month. The sum of these amounts in either month made up the amount of money available for planning that month's advertising. It was not expected that it would be possible to adhere to the exact amounts, but it was believed that the amounts for each appliance would clearly indicate to those who planned the advertising, the relative importance of the appliances to be advertised.

In actual practice, the expenditures were kept remarkably close to the sums set aside. The advertising given some appliances did not use the entire sum allowed, and in one case considerably more was spent than was planned. At the end of two months, a check-up showed that the total amount spent during the two months was within a very few dollars of the amount allowed by budget for those two months, and was under the budget, not over.*

AUTHOR'S NOTE: The above paper was written and submitted at a time when the budgeting plan had been in use for only two months. At the end of eight months, it is reported that the plan has worked with very little adjustment. Total actual expenditures have been less than the budget, and sales showed an increase.

John W. Lieb

JOHN WILLIAM LIEB, past president of the National Electric Light Association, senior vice-president of the New York Edison Company and a mechanical engineer of international experience and fame, died at his home, 30 Montgomery Circle, Beechwood Terrace, the night of Nov. 1. He was sixty-nine years old.

Mr. Lieb had been associated with the electrical industry from its beginning. For more than forty-eight years he had been connected with the various enterprises that grew out of the invention of the incandescent lamp of Thomas A. Edison, and it was Mr. Lieb who aided the inventor in establishing and proving the practicability of the first electric station in the United States, making it possible for every home and factory to use power from a central plant.

Born in Newark, N. J., Mr. Lieb was graduated from Stevens Institute of Technology in 1880, immediately after becoming a draftsman for the Brush Electric Company in Cleveland. The following year saw him in New York doing the same work for the Edison Electric Light Company, where he worked on the plans for the electrical equipment of the Pearl Street Station, the pioneer central plant for the distribution of light and power.

With the plans completed, Mr. Lieb was transferred to the Edison Testing Works in Goerck Street, where, in the experimental and testing departments, he did research work under the direction of Mr. Edison, and early in 1882 he was given charge of the installation of the "jumbo" dynamos and equipment of the Pearl Street Station. Regular service from the plant was inaugurated in September, 1882, and Mr. Lieb was appointed first electrician of the Edison Electric Illuminating Company of New York.

So precise and thorough had been his work that Mr. Edison chose him to go to Milan, Italy, to install the Milan Edison Station. Not only did he fulfill the appointed task, but, as an additional job, he built a trolley system in Milan. For his work in introducing electricity in Italy the government made him a Knight Commander of the Royal Order of the Crown of Italy, in which he later was promoted to a Grand Officer. He was also an officer of the French Legion of Honor.

After he had been an executive of an electrical company in Italy, Mr. Lieb returned to the United States in 1894, becoming an officer of the Edison Electric Illuminating Company of New York, with which he remained until the company was absorbed by the New York Edison Company in 1901. In the latter company he became successively associated general manager, general manager, vice-president, vice-president and general manager, and finally senior vice-president, which he had been for the last two years.

Mr. Lieb was a pioneer also in the advancement of technical education, and he participated in the work of many technical societies as well as writing extensively on electrical subjects and lecturing at universities and institutes. He was accredited with having the largest library and collection of documents dealing with Leonardo da Vinci, and for many years he had been engaged in investigating and translating sketches and texts covering the researches of da Vinci in natural science and engineering, these researches being transmitted to Italy through his membership in the "Raccolta" of Milan, of which Mr. Lieb was a correspondent.

In 1923, Mr. Lieb won the Edison Medal for his work in the development and operation of electric central stations. During the war he was chairman of the National Committee on Gas and Electric Service. He held offices and directorships in the New York Edison Company, the Yonkers Electric Light and Power Company, the United Electric Light and Power Company, the New York and Queens Electric Light and Power Company, the International Power Securities Corporation, the Brush Electric Illuminating Company, the Empire City Subway Company, and a number of other organizations. He was president and chairman of the board of the Electrical Testing Laboratories and vice-president of the Electric Light and Power Installation Corporation.

He served in international matters as: chairman, Section "E" International Electrical Congress, St. Louis, 1904; Representative U. S. Department of State at International Railroad Congress, Rome, 1922; member, U. S. Executive Committee, World Power Conference, London, 1924; U. S. Delegate, International Congress on Illumination, Geneva, 1924; chairman, Reception Committee, International Electrotechnical commission Meeting, New York, 1926; vice-president, International Association of Producers and Distributors of Electrical Energy, Paris, 1928; executive chairman, American Organization Committee, World Engineering Congress, Tokyo, Japan, 1929.

Mr. Lieb was a former president of the National Electric Light Association, the Edison Pioneers, the American Institute of Electrical Engineers, the Association of Edison Illuminating Companies, and the New York Electrical Society, and a former vice-president of the American Society of Electric Engineers. He was a fellow of the American Academy of Sciences and was a member of numerous other technical societies and associations. In 1921 he received the honorary degree of Doctor of Engineering from Stevens Institute.

His clubs were the Engineers, Delta Tau Delta and the Westchester Biltmore Country.

In 1886, Mr. Lieb married Miss Minnie F. Engler, of New York, who survives, with two daughters and a son. They are the Misses Julia C. and Minnie E. Lieb, and Adolph W. Lieb. A brother, Oscar J. Lieb, of Newark, and two sisters, Mrs. Charles O. Baldwin and Miss Anna Lieb, both of Caldwell, N. J., also survive.

Funeral services were held at his home on the afternoon of November 3, following the arrival of a special train from New York, and the remains were laid to rest in Kensico Cemetery.

Mr. Lieb was exceedingly active in the work of the National Electric Light Association. In addition to having been president during 1917-1918, he had served on and headed many of the important committees of the Association.

Matthew S. Sloan, president of the Association, and of the New York Edison Company, on the death of Mr. Lieb made the following statement:

"The death of John W. Lieb is a very great loss to the electric industry. A pioneer in the central station field, he gave to the industry the benefit of his sound technical knowledge and great experience through a vast amount of committee work, writing and lecturing. He labored unceasingly in improving the technique of electricity supply and was largely responsible for the rapid development and high standards of modern electric service, not alone in the companies with which he was connected, but in the entire industry. He was an idealist who could make his ideals work. His ability and high character won the respect and the affection of all who were associated with him in his widespread interests and activities."

David L. Huntington

DAVID LYNDE HUNTINGTON, president of the Washington Water Power Company, Spokane, since 1910, and prominently identified with the electrical development of the Northwest, died at his home in that city, September 27. He had been confined to his home for the past two years, although during the greater part of that time he was able to devote some attention to company affairs.

Mr. Huntington was an important factor in the growth of the Spokane utility and it was largely through his vision and guidance, in association with the late Henry M. Richards, the preceding president, that the company has reached its present position. The last big undertaking of Mr. Huntington as active head of the Washington Water Power Company was the building of the Chelan hydroelectric plant, in connection with which project he made several trips to New York and personally supervised the details of the purchase of the site, the award of contracts and the financial program formulated to see the enterprise through. Although he became ill before the work was completed he kept in touch with its progress, and it was he who pressed the electric button from his sickroom that placed the first unit in service.

Mr. Huntington entered the employ of the Washington Water Power Company in the capacity of treasurer in 1894. He was made assistant secretary in 1895, in less than a year became general manager, and in 1903 was appointed second vice-president and general manager. It was in 1910 that he assumed his executive duties as active president of the company and affiliated properties. In addition he had been president of the Spokane United Railways since that company was formed July 1, 1922.

Mr. Huntington was born in New London, Conn., and received his education in the public schools of Washington, D. C., and at Yale University. After leaving Yale he joined the Thomson-Houston Electric Company, Lynn, Mass., and following the organization of the General Electric Company, he was sent to the Philadelphia district, where he engaged in various kinds of work ranging from the selling of appliances to the building of pole lines and power plants. He resigned to become treasurer of the Washington Water Power Company. He was active in the National Electric Light Association and other engineering societies and was a fellow of the American Institute of Electrical Engineers.

Interconnection to the Rescue of Georgia City

INDUSTRIALS in Augusta, Ga., were seriously threatened during the latter part of September by high waters of the Savannah river which damaged the levee and the city-owned canal, from which the industries obtained mechanical power. The situation has been saved and prospects for the future brightened by electrification of these industries, as set forth in the *Augusta Chronicle,* Oct. 5:

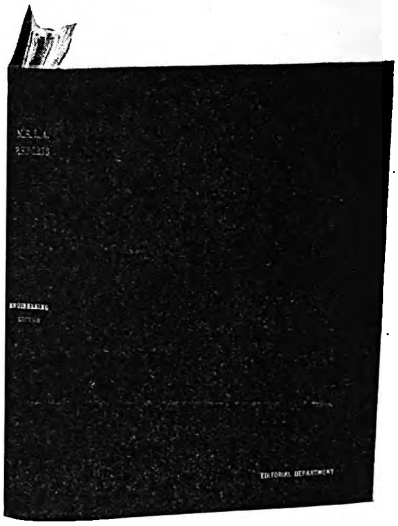
"One of the most gratifying achievements of modern times finds its exemplification in the progress evinced in Augusta at this time. Just twenty-one years ago the Augusta canal was washed out similar to the catastrophe just recorded. However, the damage at that time was not quite as great as in the present instance. At that time it took two or three months, as we recall it, to get the mills back to work. However, machinery and modern methods may make the mending quicker at this time.

"When the washout was reported last Saturday there was a sort of mournful spirit abroad in the city. Thousands of operatives faced months of idleness, or weeks at best. This was considered a deplorable condition, accentuated by winter coming along, with Christmas on ahead. At no time could mill workers afford to be idle, but certainly no more ill-timed period could have been selected.

"But progress has written a new page in Augusta's history. The officials of the John P. King Manufacturing Company, Friday signed up for the electrification of the big plant. Saturday a carload of motors were rolling into Augusta from the Georgia Power Company and yesterday the wheels of the big industrial enterprises were turning and the employees were back at work. The achievement is perhaps without parallel in American industrial annals. More than that, the Sibley Mills and the Augusta Factory also completed plans for electrification last Saturday and almost all the motors are in with others being hauled in and being installed so that the plants will be going full force by Monday or Tuesday, at latest. The Globe and Clark Mills will also complete today, or Monday, so that they will be in full operation not later than Tuesday. The Enterprise Mill, one of the largest in the city, has already been electrified.

"The record would have been impossible without superpower. The hydro-electric plant at Stevens creek is still many feet under water, but Augusta has known no interruption of light and power service. The big oil mills, lumber plants and other industries will be turning just as quickly as they can be gotten in shape, with the debris cleared up, for power is available at the switch. If it had not been for superpower Augusta would not have had any street lights and no power, and street cars would have had to cease operation. Just as the situation stood nobody knew there was any hampering of power. The auxiliary steam plant here could furnish only enough current to barely light the residences and possibly provide a little emergency current.

"Georgia's harnessed waterpower, properly distributed, brought needed aid to Augusta. It will give uninterrupted employment to Augusta's factory workers and to all others dependent upon power for a livelihood. Even the Georgia Iron Works will be electrified by Tuesday. All Augusta goes back to work by Monday, at latest, and the farmers, too, will be in action, with roads open to traffic. Business will feel the effects of recuperation within a few days and Augusta faces the future with bright prospects of going forward and doing better than ever. The impetus of determination to carry on will drive us further forward, even under the unfavorable circumstances, than we could ever have gone under lethargic conditions."



Binders for N. E. L. A. Publications

The Association offers for sale handsome, leatherette binders for those of its publications that appear periodically or in series.
The prices of these binders are as follows:

N. E. L. A. Bulletin	1.75
Rate Research	1.25
For Reports:	
Engineering Reports (Large size binder)	1.75
Engineering Reports	1.25
Accounting Reports	1.25
Commercial Reports	1.25
Public Relations Reports	1.25
General and Special Committees	1.25
Weekly Information Letter	1.25
Electrical News Items	1.25
Statistical Reports	1.25
Public Opinion	1.25
(For new series beginning Jan. 1, 1930)	
Informational Booklets	1.25

National Electric Light Association
420 Lexington Avenue
New York, N. Y.

Service Suggestions

NATIONAL ELECTRIC LIGHT ASSOCIATION — COMMERCIAL NATIONAL SECTION
CUSTOMER RELATIONS COMMITTEE
H. T. EAST, *Chairman*, Public Service Co. of Northern Illinois, Chicago, Ill.
To formulate efficient methods of conducting relations between the customer, the public and the supply company, including such matters as taking applications in the office, forms, order routing, inquiries, complaints, meter reading, collections and credits

No. 77 November, 1929

Getting the Employees' Help

IT has been proved that an uninterrupted supply of electricity at adequate pressure does not spell good service to the customer. Efficient machinery, well planned distribution systems, fine buildings, and liberal company policies mean little if the contact between employees and customers is not pleasant, exact and courteous.

Many methods of impressing the men and women of public utility organizations with the importance of the part they play have been tried. Suggestions along this line are always welcome. The Customers' Relation's Committee is constantly reviewing material prepared by member companies. The Public Relations Department of the Philadelphia Electric Company has recently prepared a booklet entitled "Sprinting for Super-Service," which is addressed to its employees, and should do much to develop a proper attitude in the minds of the personnel. This booklet is reproduced, with most of its illustrations, by special permission of the Philadelphia Electric Company.

Sprinting For Super-Service

Pleasant reports have been coming to our ears. Comments from customers tell us our employees rank among the most courteous they have ever met in a utilities company. They tell us you smile, that you meet situations with cheery graciousness, that you are patient, kindly.

A Twofold Purpose

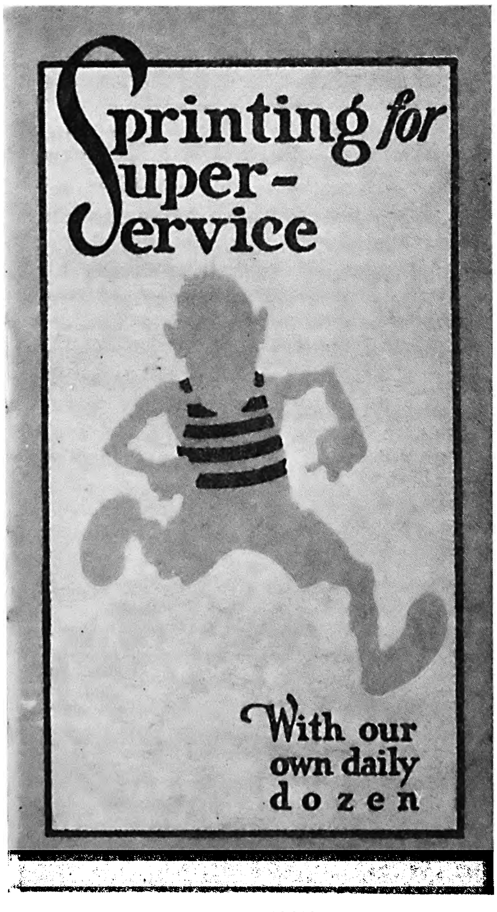
The object, then, of this friendly talk within the walls of a little book is two-fold:

1. To say that your company appreciates your fine spirit and efforts—this striving for super-service.
2. To preserve the fine standards of courtesy already won and to try for ever greater records.

Every big industry takes special pride in one phase of its business. Here is a railroad which wants to be known for its vast trackage—endless miles of glistening steel ribbons that make giant crisscrosses over the face of America. Here is a steel plant that wants more smokestacks than any other plant in the world sending great gray spirals into the sky.

Our Pride in Super-Service

We want our steel to glisten, too . . . but our great pride is to send the name of your company far and wide for its spirit of personal service. Will you, as a keen, spirited force, help us to achieve this goal?



First of all, let's stand a little closer and exchange ideas on this big subject of courtesy as it pertains to our business. For, actually, it is an exchange of ideas with surely the greater number being contributed by you.

There is no fine distinguished act of courteous service which was not first the thought of some employee rising to the need of some customer.

The Employee is the Company

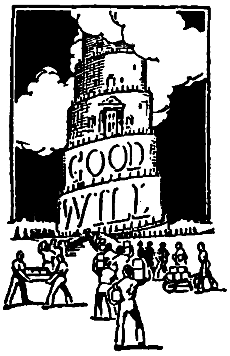
Perhaps it is an employee whose work is such that he never sees the sight of a customer during all his working hours; but who, at his lodge, his civic or country club, at the corner drug store in the evening, has remembered HE IS THE COMPANY to everyone he knows, and never failed to act loyally in that capacity. For here is a strange thing: Most merchants close their customer day when they turn the key in the shop, but no member of our force can step out in the evening and hail a passerby without encountering a customer of his company.

The Unusual Call to Service

A young man in the maintenance department strolled around to the neighborhood drug store for his can of tobacco. While he was there the lights suddenly went out. The proprietor remarked that this was the third time within a week that this had happened.

Naturally, he started to blame the company. But this particular young man noticed that the lights in adjoining properties were burning and suggested that the trouble was probably due to too small a fuse. An examination showed this to be so. A service maintenance man was summoned. The lights were shining brightly in no time.

So this code belongs to you all—not alone to service employees, salesmen, saleswomen, home service representatives, meter men, our telephone family and the rest, but to our force of nine thousand whose work weaves into the great pattern of service. It embodies ideals and practices you have set up. Although we are, of necessity, the spokesmen, you who have striven cheerfully and intelligently are the true authors of this little book, the object of which is perfection of service.



Brick by brick . . . , goes this tower

Courtesy is a Unit of Exchange

What, then, is courtesy? And, why?

Courtesy is the coin with which we buy the good-will, confidence, approval and support of our customers, the public. Without these no business can hope to succeed permanently.

Many people imagine good-will to be a big intangible thing which a company somehow magically has or has not. Good-will is never an accident. When a company possesses it there are hundreds, thousands of individual reasons. They are the individual acts of employees. Good-will is a tower of strength that can be as definitely built as the newest gold-domed skyscraper. It can be built only by employees. Every single helpful act makes the tower rise higher. Every disinterested act throws away a chance to build!

Perfect customer contact, as analyzed by a sprightly young lady employee, is divided into three parts:

THE BEGINNING
THE MIDDLE
THE END

The beginning is the most important part. Its key word is welcome. A smile at the first approach of the customer, or a kindly inquiry is worth fifty smiles and interested questions later. Who has not had the experience, at some sales counter or other, of having to coax some high-hat saleslady into good humor?

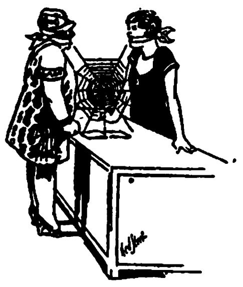
Sales in Personality

Not only does the first fifty seconds of receiving a customer set the whole tone of the contact. It sells your personality. So be yourself from the start! Why hide beneath a glum exterior? The prospector will mine for gold. But not so the average human being. He will take you at your face value. Be pleasant.

Dropping in on the high-hat saleslady

Wait on the customer as quickly as possible. "I'll be with you in a minute!" is a helpful little phrase.

Above all, in finishing the business with one customer do not adjust your blanks in so leisurely a fashion that the waiting visitor imagines you're about to play solitaire. The meeting of the employee and customer over the service desk should never turn into an endurance contest to see who will speak first. The unfailingly right thing is for the employee never to fail to put in a polite query first.

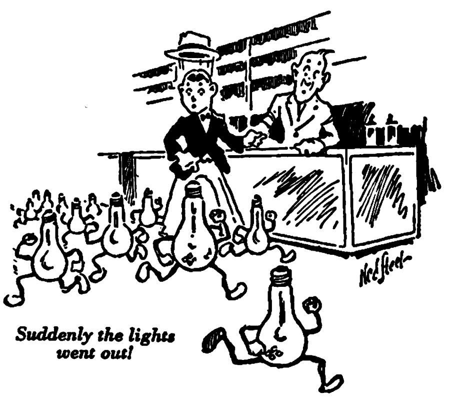


The endurance contest . . who'll speak first?

Service the Watchword

If welcome is the keyword for the beginning of the successful customer contact, SERVICE is the watchword for the middle. From the time the customer steps into the office to inquire about a contract until he is no longer on the line he deserves the best service possible. We must continually remind ourselves service is not something we are giving him. It is something he pays for, and, because of that alone, he is entitled to the best.

In the first place, remember we are a monopoly, regulated as to rates and service and financial returns by the Public Service Commission. It is not practical or economical for two companies to furnish gas or electric light in the same communities. In their ordinary business affairs, if customers are dissatisfied they can take their business elsewhere, but a public utility customer cannot go to another company, and if there were no other reason, the obligation of the utility company to give good service would be the greater.



Suddenly the lights went out!

"He acts as though he were doing you a favor," is, alas, still the label tacked to the wrong-attitude type of utilities employee. We are sure you realize your company not only does not feel it is doing its customers a favor to sell them electric current and good service with it. . . . It KNOWS this. For, while it is true the displeased customer cannot walk out and take the business of lighting his home down the street to a rival concern, he can take his friendship, his loyalty, his good-will where he pleases.

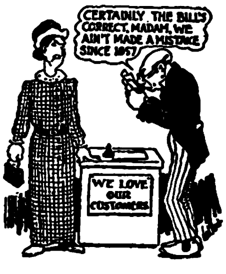
This is a far greater loss than if he were actually to say, "I don't care to do business with you folks any more," and go out the door.

Take a personal interest in your customer's problems or question. Play the host if it's the matter of a contract. If you can discover the gentleman's name, call him that—by all means. Make him feel that he is entering on a fine new friendly relationship; let him realize that everything will be done to serve him and his family and his home in their electrical or gas needs. Show this customer that your organization is striving to lead in the utilities field in the spirit of personal service.

Be Alert, Wide-Awake!

Be alert, wide-awake, thinking ahead for the newcomer.

Tell him the deposit is eventually returned to him with interest. Don't make him drag it out of you like pulling teeth. The expenses of life, no matter how small, interest us all.


CERTAINLY THE BILL'S CORRECT, MADAM, WE AIN'T MADE A MISTAKE SINCE 1857
WE LOVE OUR CUSTOMERS

Section II, Bylaw 3, The Maddening Act

Listen to complaints and criticisms and suggestions as well as to the usual business which you handle each day. Treat a customer's opinions with consideration.

Interpreting Company Policies

A personally interested employee has never answered a question about a certain practice or procedure of the company with a brief "It is the rule." Nothing is more maddening to any of us than to have someone calmly refuse to give us the reason for something. Most employees do know and give the fair reasons that lie back of rulings. If you

Just after a little information!

sincerely do not know, there's always the way of assuring the customer that there must surely be a good reason and you'll make it your business to find out. We make friends for the company when we try to interpret its policies in friendly fashion. Up rises that tower of good-will.

It is a mighty job feeding great communities with gas and electricity, and we who stand at our posts know it. But our business is complex and technical, it cannot be familiar to all. So if a complaint seems a little unreasonable, remember it does not seem so to the man or woman who is making it. For this reason be patient, tactful, considerate and helpful.

Be careful, for if you are careless in getting the right name and address, if you make promises that you are not sure can be kept, if in your desire to make a sale you overestimate or exaggerate, the whole ends of striving for super-service are defeated. If the name and address are incorrect, service is delayed, bills are missent, and an endless chain of trouble and inconvenience result. The customer is seriously put out. The company is perhaps irreparably wronged in the eyes of that customer—all because of the failure of someone who was tired, of someone whose mind was perhaps on something else.

Failure to listen and note carefully makes it necessary to do something twice when CARE would have required it to be done only once.

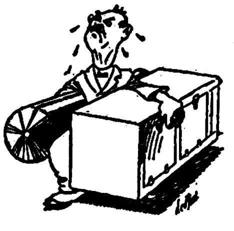
A Lesson in Mother's Maxim

Always keep a promise!

Here is an instance where fate and the promise-maker played the same unhappy prank on the same woman twice. Shortly before the Christmas rush she bought a lamp. She explained very carefully that it was a Christmas gift and that it MUST be delivered the day before Christmas day. This was promised. The delivery was made the day after Christmas day. . . . Six months later the same customer bought a daylight lamp for her kitchen. Having in mind her previous disappointment, she was most careful about settling on the exact day the light should be sent and installed. The promise was made.

Two days after the failure of the lamp to arrive she wrote a letter outlining these two unfortunate experiences.

Somewhere between the sale and the delivery of these two articles someone had failed to do the job. " 'I'll do it myself,' said the little Red Hen," is an adage many of us have heard our mothers quote when someone in the household failed on a particular task entrusted. It is a homely little maxim that has its place in the business world as well as in mother's store of wisdom. We can't put refrigerators and gas water heaters under our arm and cheerfully lug them to customers. But we can all keep a weather eye on our given word.



If we could only put 'em under our arm!

But most of all these two hapless experiences which befell the same customer go to show that while the work of thousands of our employees may not have directly to do with the customer, it has a very direct bearing. Their work is an important link in the chain of service and unless it is done with a sense of its special relations to super-service there can be no such aim in our organization. Unseen employees may surely be called the guardians of our promises.

No member of our force with a sense of his responsibility has ever fumed or grumbled before customers when the pressure of work around his desk or counter grew heavy. He has never exchanged remarks with fellow-employees about "this terrible rush," "all those people," and made similar tactless slips. This seems as rude as insulting guests in our homes.

That Gracious "No"

Clothes may make the man, but voice makes his personality. Two men and two women may say exactly the same words and create two entirely different impressions—one favorable, the other unfavorable. The difference is that one's voice was curt, lifeless, disagreeable; the other's was pleasant, animated, winning. Occasionally, some great man in speaking of his life will say one of the first great lessons he learned was how to say "No." Yet a greater man still will always top him by saying his first great lesson was how to say "No" graciously. Learn to say No graciously. If you cannot grant the request of a customer BE SORRY. NEVER BE GLAD.

Pleasing Appearance Helpful

Clothes are important in facing the world—and our customers. Take pride in your personal appearance — for it wins battles for us and those of us who come in direct contact with the public should be sure that our clothes are neat and clean and brushed, our finger nails and hands well kept

Learning to say it graciously

A DAILY DOZEN FOR COURTESY

1

Welcome the customer. Not with a brass band. Friendliness is the music of the human parade.

2

Compete to make the service desks and sales floor as cheery as last Sunday night's pick-up supper.

3

On your toes! *Exercise* personal interest in your customer's problem.

4

Exhale carelessness, inattention and arguments!

5

Inhale pep, alertness and glad-to-help-you, Mr. Jones!

Stop and listen—to complaints, criticisms and all suggestions. Many a man is sitting on the top of the world all because he was a good listener.

7

Smile. It will pave the way for amicable adjustment of a complaint, for the sale of appliances and a place in the hearts of your fellow-men.

8

Try this one: use your good judgment. Judgment, like knees, gets creaky when out of service.

9

Now give your heart a workout. Say "no" with regret. If you can't grant the request of a customer, be SORRY. Never be GLAD.

10

Be YOUR COMPANY—at the service desk, at the meter, on the stairway and in the hall. As far as the world is concerned, you are the President and the Board of Directors.

11

Be YOURSELF. Why hide beneath a glum exterior? The prospector will mine for gold. But not so the average human being.

12

Play the game. It is your turn today—mine tomorrow. "Would you have your name written in the hearts of men? Then serve them gladly."

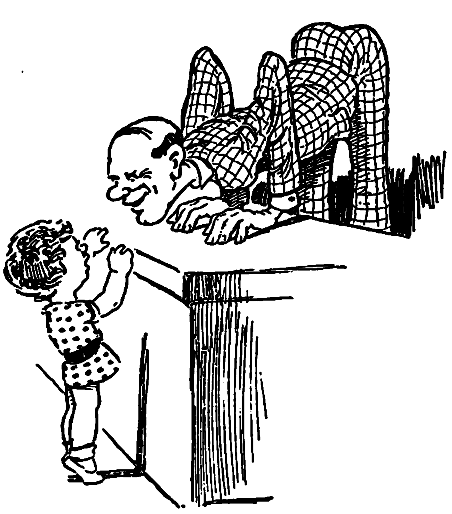
and our general appearance pleasing. We feel and act as we look.

If Welcome is the keyword for the beginning of customer contact, Service the watchword for the middle, then Happy-to-Help-You-Any-Time is the spirit of the close. Much has been written about first impressions; little about last impressions. Yet we all know the pleasant parting sends us forth with a lift, putting us on good terms with all the world.

But Beginning, Middle or End, here is one inviolable mandate which no earnest, kindly member of our organization has ever chosen to violate:

Treat every customer with the same kindness and deference, irrespective of the sex, the color or the race. See that the smallest and the poorest customer receives the same prompt and interested treatment that the largest and the most important gets.

Public relations are nothing more than human relations, friendly human understanding. We deal with men and women like ourselves. If we can remember that they are after all just neighbors and it is just as important to have good relations with them as next-door neighbors, we shall be doing the fine thing for the community and for our company.



Taking an interest in the smallest customer

Aim at Service! . . . Is it worth while?

Wrote Angelo Patri, the teacher-philosopher:

"The world goes forward on the hands of workers, but it is proved among us that it cannot go far on efficiency alone. Into each bit of labor must go some little of the magic of service. Would you have your name written in the hearts of men? Then serve them gladly . . . it is not enough to do the job well. It is not sufficient to meet obligations promptly and justly. The spirit of service must breathe life into the work of our hands, or it perishes—and we along with it.

Additional Copies?

INVESTIGATION shows that only a comparatively small number of the men and women of the light and power industry who are interested in the subjects covered by Service Suggestions receive them. To meet the situation, Service Suggestions are reproduced in loose leaf form. Copies may be ordered direct from the office of the chairman. A charge of five cents is made to cover the cost of reproduction.

Any desired number of copies of an issue may be ordered or a standing order can be placed for a specified number of additional copies each month. Standing orders may be placed on an annual basis to save the annoyance of remitting small sums each month.

The subjects covered in recent issues were:

63—Courtesy Letters.
64—Tree Trimming from the Public's Viewpoint.
65—The Telephone as a Service Medium.
66—Handling Requests for Discount Allowances.
67—Informing our Customers about our Business.
68—Training Employees in Customer Relations.
69—Records that Speed Service.
70—Employee and Consumer.
71—Correspondence for Good-Will.
72—Teaching Customers to Read Their Meters.
73—Mechanics of Correspondence.
74—The Bill Jones Idea.
75—Active meters in Vacant Premises.
76—"Pay Bills Here."

H. T. EAST, *Chairman,*
1427 Edison Building,
Chicago, Illinois.

Electrical Research Statistics

November, 1929

Issued Monthly by Statistical Research Department of the National Electric Light Association
420 Lexington Ave., New York, N. Y.

H. A. Snow, *Chairman, Statistics Committee, Accounting National Section*
Wm. M. Carpenter, *Economist*
H. S. Bennion, *Director of Engineering, N. E. L. A.*
Merle Rainey, *Statistician*

The National Electric Light Association, a voluntary organization of companies and individuals affiliated with or interested in the electric light and power industry, organized to advance the art and science of the production, distribution, and use of electrical energy for public service.

The Association maintains a Statistical Research organization which collects, interprets, and makes available basic statistical information on the electric light and power industry. The publications and services of this department are available to all those interested, on request.

Current Statistics of the Electric Light and Power Industry

(*As of August* 31, 1929)

The data here presented are for the total (100 per cent) electric light and power industry and are based on monthly reports received from some 400 companies, representing over 86 per cent of the industry.

	JULY		Per Cent Increase	AUGUST		Per Cent Increase
DURING MONTHS OF JULY AND AUGUST	1929	1928		1929	1928	
*Kw-hr. generated (net)	7,534,129,000	6,664,443,000	+13.1	7,769,016,000	7,029,816,000	+10.5
Add—energy imported from Canada and purchased from outside the Electric Light & Power Industry	178,710,000	195,000,000	− 8.4	209,000,000	209,000,000	
Less—energy used in company departments	191,000,000	192,000,000	− 0.5	190,000,000	209,000,000	− 9.1
Total energy for distribution (kw-hr.)	7,521,839,000	6,667,443,000	+12.8	7,788,016,000	7,029,816,000	+10.7
Sales of energy in kw-hr. for:						
Farm service (not involving irrigation)**	7,264,000			8,726,000		
Farm service (involving irrigation)**	174,997,000			194,376,000		
Domestic service	629,780,000	549,314,000	+14.6	634,636,000	532,398,000	+19.2
Commercial service:						
Small light and power	957,671,000	868,832,000	+10.2	1,043,589,000	871,752,000	+19.7
Large light and power	4,025,672,000	3,536,401,000	+13.8	4,162,965,000	3,755,076,000	+10.9
Railways and railroads (motive power)	390,485,000	389,598,000	+ 0.2	392,087,000	399,340,000	− 2.9
Other sales to ultimate consumers	143,231,000	130,298,000	+ 9.9	154,739,000	139,250,000	+ 6.6
Total sales to ultimate consumers (kw-hr.)	6,146,839,000	5,474,443,000	+12.3	6,388,016,000	5,697,816,000	+12.1
Total revenue	$160,400,000	$147,600,000	+ 8.7	$163,007,000	$149,303,000	+ 9.2
Revenues from sales for resales and miscellaneous (included above)	10,700,000	9,700,000	+10.3	11,485,000	10,602,000	+ 8.3
DURING THE TWELVE MONTHS ENDING	JULY 31, 1929			AUG. 31, 1929		
*Kw-hr. generated (net)	87,883,572,000	....	....	88,622,772,000	(Comparable data here will commence Jan. 1, 1930)	....
Add—imports from Canada and purchases from outside the Electric Light & Power Industry	2,180,917,000	....	....	2,180,917,000		....
Less—energy used in company departments	2,559,000,000	....	....	2,540,000,000		
Total energy distribution	87,505,489,000	....	....	88,263,689,000	....	....
New generating capacity installed (kw.)	1,148,000	....	....	(Not yet available)		
Number of new customers added:						
Farm customers		....	....		....	....
Domestic customers	1,000,000	....	....	832,000	....	....
Commercial customers	116,000	....	....	77,000	....	....
Others	4,000	....	....	2,000	....	....
Total customers added	1,120,000			911,000	....	....
Important factors:						
Percent of energy generated by waterpower	38.7	....	....	37.2	....	....
*Average pounds of coal per kw-hr. generated	1.68	....	....	1.68	....	....
Domestic service (residential use):						
Average annual consumption per customer (kw-hr.)	482	....	....	484	....	....
Average revenue per kw-hr	6.36c.	....	....	6.33c.	....	....

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*By courtesy of the U. S. Geological Survey with deductions for plants not considered electric light and power enterprises.
**As reported by 100 companies only, included in figures below.

Basic Information on the Electric Light and Power Industry

As of August 31, 1929

The data included in this table are basic factors of the electric light and power industry and will be brought up-to-date at the end of each month and published in each issue of the BULLETIN.

1. Value of plant and equipment (estimated)	$10,400,000,000*
2. Total generating capacity in kw	28,635,000
Steam	20,746,000
Waterpower	7,577,000
Internal combustion	312,000
3. Total number of customers served	23,761,000
Farm customers (as reported by 174 companies only)**	(240,259)
Domestic customers	19,569,000
Commercial customers—	
Small light and power	3,606,000
Large light and power	552,000
Others	34,000
4. Population in electrically lighted homes	82,200,000
5. Percentage of homes which are served with electricity	67
6. Miles of transmission lines (11,000 volts and above) (circuit miles)	158,000*

*Subject to revision. **Included below.

Operations of the Electric Light and Power Industry During August, 1929

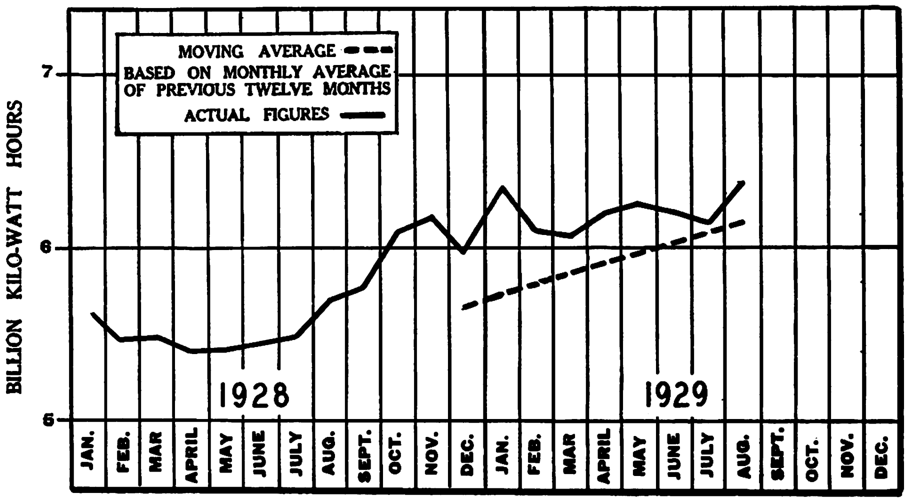
THE statistical summary of the distribution of electricity during the month of August shows only a slight decline in the high level of industry and trade which has prevailed since early in the year. Since Jan. 1 total sales of large industrial power were 30,100,000,000 Kw-hr., an increase of 3,671,000,000 Kw-hr., or nearly 14 per cent, over the corresponding period last year. A further shrinkage in the production of hydro-electric energy is noted and (unless a decided change in climatic conditions takes place) for the first time since 1921, water power production will, during 1929, undoubtedly be smaller than it was during the previous year in spite of a large increase in the demand for electricity. During the first eight months of 1929, the output of water power plants, as reported by the United States Geological Survey, had increased by only two per cent over the first eight months of 1928, while the production of energy by fuel-using plants had grown by 18½ per cent. To a very large extent this has been the result of the prolonged drought throughout the Northern part of the United States, which has had serious results upon the agricultural outlook of many areas.

Seasonal Swings in the Average Price of Electricity

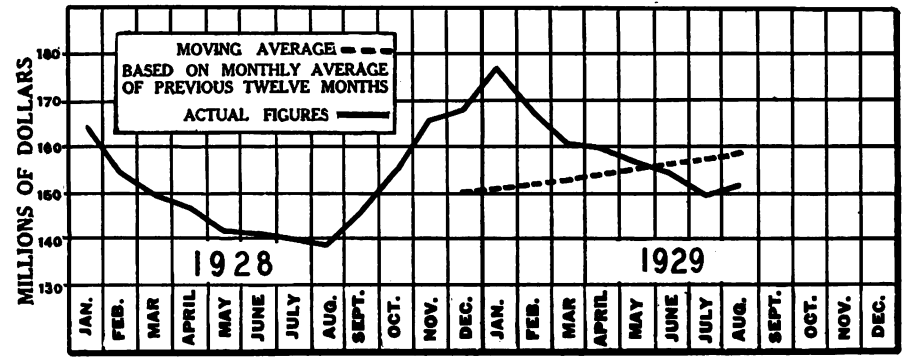
The average revenue per Kw-hr. sold to consumers is readily obtainable from the published monthly table of current statistics. There is a regular seasonal variation in the monthly average figures, beginning with a high point in December (when the proportion of lighting service in the grand total of sales is at its maximum) and ending with a low point in August (when the proportion of lighting service is at a minimum and the requirements for irrigation pumping are usually at their peak. Inasmuch as the current series of statistics has thus far been published only for the months of declining averages, it is entirely possible that some erroneous conclusions have been drawn as to an extraordinarily rapid fall in average revenues from 2.78 cents per Kw-hr. in January to 2.37 cents in August.

The course of sales, revenues and average prices of electricity sold to all consumers is shown in the diagram, where the solid line represents actual figures for each month and the dotted line the average for the twelve months period. While subject to a very decided seasonal fluctuation, there is a downward trend in the average revenue per Kw-hr. sold. For the year ending with December, 1928, it was 2.64 cents; for the year ending with August, 1929, it stood at 2.58 cents—a decrease of somewhat more than two per cent.

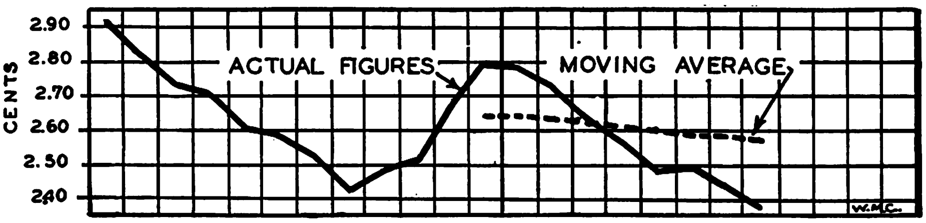
SALES TO ULTIMATE CONSUMERS



REVENUES FROM ULTIMATE CONSUMERS



AVERAGE REVENUE PER KWH SOLD



ENGINEERING SECTION

ALEX. D. BAILEY, *Chairman* H. S. BENNION, *Director of Engineering, N. E. L. A.*

Group Meetings of Engineering National Section Committees at Pittsburgh, October 1-3

Accident Prevention Committee Meeting

C. R. BEARDSLEY, *Chairman*

THE central thought of the October, 1929, Pittsburgh meeting of the Accident Prevention Committee was the responsibility of the Accident Prevention Chairmen of the Geographic Divisions. A meeting of these chairmen, who are representatives of their Divisions to the main committee, was attended by men from the following Divisions: East Central Division, Eastern Division, Southeastern Division, New England Division, Southwestern Division, Northwestern Division, Pacific Coast Division.

It is not sufficient for the Divisions to hold rallies of employees and foremen. It should be the aim of each Division to secure active effort in every member company property. Obviously the key to such activity is the executive head of each property. One Division has been particularly successful through the forceful but diplomatic efforts of its Chairman directed personally to executives of his Division. The greatest reduction of accident rate in any division has been achieved by this Geographic Division.

A very encouraging feature of the meeting was the very evident increase in interest in accident prevention on the part of other committees of the Engineering National Section and the appointment of executives and operating engineers in charge of field forces to represent their companies on the Accident Prevention Committee.

Subcommittee Reports

While the majority of reports were of progress, one was in final form and was adopted, and the following deserve comment:

Construction—M. R. Sumner, Chairman. Report on safe practices in heavy construction work was reviewed, but adoption delayed in order to obtain comment from new members. Adoption scheduled for January meeting.

Insull Medal Awards—Wills Maclachlan, Chairman. The increase in effective resuscitation work is in evidence through the increase in awards.

Low Voltage Hazards—E. W. Gorry, Chairman. The use of "Common Sense" envelope stuffer was discussed. One company is sending out 350,000 of these to consumers.

High Voltage Testing—C. C. Steck, Chairman. A report started during 1928-29 year, was completed and adopted for publication.

Tree Pruning—James Hill, Jr., Chairman. A report will be re-edited and extended for review in January or March. The Davey Tree Expert Company and Nelson and Kuemmerling are cooperating with this committee.

Rubber Gloves—K. R. MacKinnon, Chairman. Interesting test developments were reported on the effects of ozone on gloves in higher voltage use. This matter has been referred to the Special Research Committee with recommendation for further tests.

New Undertakings

Jointly with Electrical Apparatus Committee a report will be prepared on Safety Locks. This report should be valuable. A report will be started with the aid of the Inductive Coordination Committee on the "Hazards of Private Communication Lines." For companies undertaking to install such facilities, the experiences of those which have private lines will be of value.

Information is being collected concerning the hazards that may be present in consumer vaults and premises where both company-owned and consumer-owned equipment is in closest adjacent physical relation.

Future Meetings

The remaining meetings will be:

January—Place to be announced;
March—Edgewater Beach Hotel, Chicago;
June—During Annual Convention, San Francisco.

Engineering Research Committee Meeting

C. F. HIRSHFELD, *Chairman*

AT the meeting on October 1, at Pittsburgh, of this recently organized committee, the chairman outlined what the Committee expects to accomplish in its work.

The scope of this Committee will be to do everything reasonably within its power (a) to foster research and (b) to make available to member companies the results being obtained from research. The Committee will interest itself in the whole field of research from pure science research at one end, to the roughest kind of applied science research on the other end. It will strive to foster pure science research in proper places and will undertake to interpret the results of such research in general language calculated to make these results understood by and useful to engineers and executives generally in the light and power industry. The National Executive Committee has approved the employment of a staff assistant at N.E.L.A. Headquarters to devote his time to the work confronting the Committee.

Ultimate expansion of the Committee is possible so as to spread its work outside the scope strictly of the Engineering Section, into the field of the other Sections wherever research work is being or should be done. No doubt technical subcommittees will be organized later to deal with research in certain special fields; membership on these subcommittees will probably be drawn from research specialists in the member companies.

The Committee, and in particular the staff assistant, will try to keep in touch with all research work going on everywhere, to determine specifically what is being done, where and by whom. In each particular field calling for study, analyses will be made of the information that is needed as compared to the definite research work being done to get this information, and an effort will be made to eliminate any unprofitable duplication and to enlist and direct efforts of research organizations to undertake research covering those parts of the whole problem which are not being covered by the existing studies.

The Committee will have four main duties: (a) to contact with the laboratories of schools, of endowed research institutions, of the government, of manufacturers, and of our own companies; (b) to advise on the order of merit of research projects to be undertaken by the National Electric Light Association itself; (c) to act as an advisor and perhaps umpire on joint research projects between manufacturers and operators; (d) to stand ready to advise our member of the Committee which is acting as trustees of the National Pure Science Research Fund, particularly with a view of pointing out what pure science research is needed in the further development of the electrical industry.

At present about $200,000,000 is being spent annually on applied science research, $70,000,000 by governmental bodies and $130,000,000 by industry itself. An almost negligible sum is being spent on pure science research which furnishes the raw materials for applied science research. The Pure Science Research Fund was advocated by Mr. Hoover to improve this situation in order that the raw material for industry may be produced now as against future needs. The fund was planned on the basis of expending $2,000,000 per year for a period of 10 years.

Electrical Apparatus Committee Meetings

R. A. Hentz, *Chairman*

THE Electrical Apparatus Committee held its first meetings of the year in Pittsburgh on October 2 and 3, in conjunction with the Group Meetings of the Engineering National Section. Attendance at the Electrical Apparatus Committee meetings totaled 114. The following paragraphs briefly outline some of the more important discussions which took place:

Oil Circuit Breakers

Several new developments in connection with circuit breakers attracted much interest at the meeting. Representatives of the Philadelphia Electric Company and the General Electric Company discussed operating experience indicating the need for high speed switching and described recent tests on a 220-kv. high-speed oil circuit breaker on the Philadelphia Electric Company system. In this breaker, very high operating speeds were obtained. A representative of the Westinghouse company reported on new developments of his company in connection with high-speed switchings at both low and high voltages. Interesting figures were brought out with regard to the necessity of high-speed switching to avoid out-of-step conditions in generating plants. Judging from the reports at the Pittsburgh meeting, breakers are now available which will clear a fault in 6 to 10 cycles compared with 25 to 40 cycles heretofore. The discussion of switching at high voltages probably aroused more interest than any other topic discussed, since the subject of oil circuit breakers affects every operating company regardless of location or size.

The pioneer work done by the Association of Edison Illuminating Companies in concentrating attention on the deficiencies in previous types of oil circuit breakers as to design, construction, and maintenance has been summarized by the Protective Equipment Subcommittee of the Electrical Apparatus Committee and has been presented to all Apparatus Committee members in the minutes of the Pittsburgh meeting. This review of the 1929 A.E.I.C. Report should prove of interest to all electrical men and member companies.

Recent successful experiments with new types of non-oil-throwing circuit breakers for 15 kv. and below and 5000 to 10,000 amperes rupturing capacity have led to the suggestion that these breakers could be used more widely if their merits were full appreciated. Such a move would tend toward standardization.

The work of the Electrical Apparatus Committee in standardizing practice and definitions for trip free devices on oil circuit breakers has been practically completed and the National Electrical Manufacturers Association has adopted definitions which are satisfactory to the N.E.L.A.

The Committee on Preferred System Voltages presented a progress report stating that oil circuit breakers rated in accordance with the new standard system voltages would be cataloged as standard equipment on and after March 1, 1930.

Power Transformers

The question of standardizing transformation angles between various voltages in use on power systems was discussed. In view of the increasing tendency toward interconnections between individual companies, it is highly desirable that for all power systems any one voltage will bear the same angular relation to any other voltage, a condition which will greatly facilitate the making of the interconnections. The importance of this matter was generally recognized and further study will be undertaken. One of the counsellors pointed out that if the Electrical Apparatus Committee could assist other committees in working out a standard of phase displacement and could expedite its adoption by even one year, it would probably save the industry an amount equal to the cost of all Engineering National Section meetings for several years. Several suggestions as to phase displacement were discussed.

Constant Current Transformers

The proposed A.I.E.E. standards for constant current transformers were discussed and did not seem to meet quite fully with the requirements of the various companies as regards to temperature rating conditions and proper capacity for light load operation. Considerable operating and design information was presented at the meeting.

Lightning Arresters

There was considerable interest in the matter of determining the efficiency of various lightning arresters, especially as concerns the virtues of the various types and makes and the possibility of determining if and when they operated during storms. It was pointed out that two large manufacturers were now cooperating on standard impulse waves for arrester tests. The need for such a standard wave was emphasized, so that different makes and types of arresters can be tested on a comparable basis.

Peterson Coil

The Protective Equipment Subcommittee has arranged through the courtesy of the Georgia Power Company to make available to the Apparatus Committee a report on the Peterson coil now installed on the 38-kv. system in north Georgia. The operating record of this coil during the 1929 lightning season is included as an appendix to the minutes of the meeting.

Fractional Horsepower Motors

It was reported that final agreement has been reached by appliance manufacturers and the light and power interests on the characteristics of single phase 110 volt motors of one-third horsepower and less. Most appliances are now equipped with motors of approved characteristics, and announcement was made that on Jan. 1, 1930, those not now so equipped will appear on the market with motors approved under this agreement.

Outdoor Substations

Quite a few topics connected with outdoor substations are on the program of the Station Design Subcommittee. A very valuable preliminary report on bus spacings and ground clearances was presented at the meeting. A comprehensive report on grounded vs. insulated operating platforms for outdoor switches was also submitted. Designers will be particularly interested in the proposed report on types of outdoor station structures.

Current Transformers

Data on improved designs of low ratio current transformers were presented for the first time, as was a new type of low voltage current transformer for industrial metering. The new type of low voltage transformer means a great saving to many companies in connection with service installations.

Several companies brought up the matter of additional information regarding performance of current transformers under high overload and short circuit conditions, as such information is necessary from both the safety and relay protection standpoints. Steps are being taken to secure data of this type from the manufacturers.

Control Cable

A proposed standard for colors for multi-conductor control cable has been prepared and is practically ready for recommendation as standard. It is believed that this proposed standard will result in larger stocks by the manufacturers and less special requirements by the consumers, which will mean better delivery and prices.

Interlocking

The Protective Equipment Subcommittee is preparing a report on all types of mechanical and electrical interlocking for switching equipment.

Power Stations

The electrical features of the new Deepwater Station, jointly owned by the American Gas and Electric Company and the United Gas Improvement Company, and the new Delray No. 3 plant of the Detroit Edison Co., were described in detail. A preliminary report was presented covering electrically-driven auxiliaries for steam generating stations.

Installation Rules

The Utilization Subcommittee is working on the preparation of standard or typical service installation rules, representing the best thought of many companies. The starting rules for large motors have been discussed at length and a few principles determined as essential.

The matter of arranging services and service connections to provide adequate supply to hospitals, theaters, hotels, and public buildings will be considered at future meetings. All companies realize their responsibility in providing adequate service to such institutions and are very much interested in ways and means of so doing.

Relay Handbook

The Electrical Apparatus Committee of the N.E.L.A. and the Protective Devices Committee of the A.I.E.E. are now engaged in revising the Relay Handbook, and an outline of the proposed procedure and personnel undertaking this revision was presented.

Future Meetings

It was announced that the next meeting of the Electrical Apparatus Committee would be held in New York City the week preceding the mid-winter meeting of the A.I.E.E., so that members residing at a distance could cover both meetings with one trip.

Hydraulic Power Committee Meeting

Byron E. White, *Chairman*

THE Hydraulic Power Committee held its regular fall meeting at Pittsburgh, on Monday, Sept. 30 and Tuesday, Oct. 1, preceded by an inspection trip on Sept. 28 and 29, to the Lake Lynn, W. Va., and Deep Creek, Md., plants of the West Penn Power Company and Associated Gas & Electric System, respectively. Forty-two persons attended the meeting at Pittsburgh, while 27 participated in the inspection trip, both of which are record numbers.

Draft Tube Tests

One report was approved for publication; namely, that of the Subcommittee on Draft Tube Tests, which comprises a considerable number of tests of draft tubes, which data will be published without comment save the necessary explanation to interpret the test data. This, it is felt, will be of great value to engineers who are confronted with the problems of draft tube design, and particularly those brought about by space limitations and the necessity to fit a special type of draft tube into cramped quarters.

Welded Penstocks

A considerable amount of discussion was had on the subject of welded penstocks, and many divergent views were expressed. With the sources of information revealed by this discussion, it is expected that the committee on that subject will be able to go forward with the production of a report for presentation at the committee's March meeting.

Discussion of the subject of fatigue of metal in penstocks also brought out much interesting information on this subject, which confirmed the desirability of the investigation being undertaken by the subcommittee on that subject. It is probable that this report will be ready for submission at the next meeting of the committee, in form for approval for publication.

Hydraulic Turbine Governors

The Subcommittee on Hydraulic Turbine Governors presented an interesting progress report which elicited considerable valuable discussion, the results of which indicate that this subcommittee also should be in a position to present a final report at the next meeting.

Forecasting Stream Flow

In connection with the subject of the forecasting of stream flow, which has occupied the attention of the committee from time to time, for the past five years, Abraham Streiff, hydraulic engineer, of Jackson, Mich., presented a very interesting discussion of his cyclic analysis of runoff, accompanied by lantern slides and blackboard sketches. His discussion was extremely clear and convincing, and will undoubtedly result in more widespread attempts to forecast stream flow, by the use of this method, or some modification of it. In the discussion which followed, other systems of forecasting which have some resemblance to that of Mr. Streiff, were also discussed. It is clearly evident that decided progress is being made in this abstruse and complicated subject, and that valuable results have been secured in the past, while there is very bright promise of even more worth while results to be secured in the future. The Hydraulic Power Committee would be glad to get in touch with any who are working in this field, and who have any variations which seem to have value.

Pitting of Water Wheels

The pitting of water wheels, and welding to correct this condition, received considerable attention. Certain bronzes have been developed which seem to offer possibility of largely overcoming, or at least correcting the condition of pitting after it has developed. The Subcommittee on Welding is gathering information, with the definite promise of submitting to the spring meeting a report for publication.

Fishways

J. E. Yates, of Portland, Ore., chairman of the Subcommittee on Fishways, made a most interesting report, outlining the very real progress made in connection with electric fish stops or screens, and futher projected experiments with fishways. Major H. S. Bennion announced to the committee, that its request for an appropriation from the association toward the carrying out of Mr. Yates' experiments, had been approved. The results of these experiments will have much to do with influencing the future of hydro-electric projects in the Northwest.

Dams

The Subcommittee on Dams made no report, but the Chairman of the Hydraulic Power Committee stated that it is undertaking the preparation of an outline of an investigation, which it is hoped will be undertaken with the object of clearing up much of the uncertainty with regard to construction of dams, and particularly of foundation conditions. This, it is hoped will be ready for submission at the ensuing meeting.

Automatic Hydro Plants

The Subcommittee on Automatic and Semi-Automatic Hydro Plants also submitted a most interesting report, which was outlined to the committee by Mr. Chester Lichtenberg. It was the consensus of opinion that this report summarizes the subject clearly and concisely, and it was voted to authorize it for publication, subject to like approval on the part of the Electrical Apparatus Committee.

Penstocks

The Penstock Subcommittee, whose report was presented to the spring meeting, reported that additional data promised at that time would be in hand within a few weeks, and that then the report would be forwarded for publication.

New Work

Under the heading of New Subcommittee Work, the most important suggestion was that of the economic coordination of steam and hydro plants. In connection with it, the desirability and even necessity for simplification and reduction of cost in hydro plants and their details, was very clearly brought out. A new subcommittee to investigate these matters was authorized, and a preliminary report is expected at the spring meeting.

Inspection Trip

The inspection trip preceding the meeting again proved the desirability of this feature, and its very definite value through the intimate personal contacts formed, and the detailed confidential information exchanged in an atmosphere of cordial friendliness. Those who participated were unanimous in the opinion that the inspection trip was of even more value to the individuals who participated in it than the more formal meeting of the committee. All are agreed that this feature should be continued.

In appraising the value of such an inspection trip, it is important to remember the fact that those who participated in them are specialists who are each familiar with some more or less particular branch of hydro-electric engineering, and that the free exchange of information between such men is essential to the most rapid development and progress in this field. This can best be brought about under the conditions obtained in an inspection trip, where men are free to make contact with one another without restraint, and are not required to devote their attention to any set subject.

All indications point to the growing influence of the Hydraulic Power Committee as the preeminent organization of hydraulic engineers in America, where the latest ideas and practices are informally and frankly discussed, thereby enabling them to be more promptly put into general use, than would be the case with a less intimate and more formal organization.

Inductive Coordination Committee Meetings

H. L. Wills, *Chairman*

The fall meeting of the Inductive Coordination Committee, Engineering National Section, N. E. L. A., was held in Pittsburgh, on Oct. 2 and 3, in conjunction with the meeting of other engineering committees. The meeting was attended by twenty-eight members of the committee and twenty-three visitors.

Current Cases

About a dozen current cases which had been brought to the attention of the committee since its last meeting were discussed in detail. The discussion of the current cases involved a presentation of the outstanding facts of each case, and a review of the solutions. This discussion of each case, assists in giving the members and visitors to the committee, information on the present trend of the solution of the various situations. A number of current cases are solved without any consideration beyond the Power Company engineer and the Telephone Company engineer immediately involved. This is a way of handling cases which the committee is attempting to foster by increased education of the Power Company engineers in the fundamentals of Inductive Coordination and the application of the Principles and Practices to every day field problems.

The major number of the current cases that require serious consideration at the present time relate to over-voltages induced into the communication circuits during time of faults on the paralleling power circuits. The Joint Development and Research work has developed means for handling practically any noise situations that arise.

J. O'R. Coleman, of N. E. L. A. Headquarters Staff, presented several lantern slides showing a new method which is being developed by one of the Project Committees to assist in predicting voltages on communication lines due to proposed power line construction. Any calculations of this character made at the present time, may contain large errors due to local geological conditions. It is the hope of the Project Committee that this new method will permit a correct determination of the necessary constants for the given location with comparatively simple and inexpensive tests.

Radio

The work being done in connection with Radio Interference complaints was reviewed by the committee. The introduction of the A. C. receiving set has increased the number of interference complaints that are received by Power Companies. It was stated that several A. C. receiver sets have been placed on the market which do not contain proper filter circuits. These sets will operate satisfactorily on power systems with exceptionally good wave shape. On other systems a situation requiring serious consideration has arisen.

The high voltage pin type insulator on existing lines still presents a serious problem. It appears that the problem has been largely solved for insulators to be placed on new lines. The National Executive Committee appropriated $3,000 to be used for research work on this problem. The Northwest Geographic Division has had this problem under some study and carried on some work with the Oregon Agricultural College. The committee recommended that this money be placed at the disposal of the Northwest Geographic Division for use at the Oregon Agricultural College.

Space Radio

The Federal Radio Commission has refused all recent applications of Power Companies for experimental licenses. They have, however, granted station licenses to permit the operation of stations for a period not exceeding 15 minutes per day. The commission has granted the companies applying for these licenses, a hearing in the near future and it is hoped that a case will be presented which will convince the commission of the necessity of permitting a longer operation of these stations during the development stage.

Geographic Division Representatives Meeting

A dinner meeting of the Geographic Division representatives was held in order to discuss the problems of the Geographic Divisions. The representatives felt one of their greatest needs was to obtain more detailed information on the work of the Joint Subcommittee on Development and Research. It was pointed out that it was necessarily a slow process to develop the fundamentals of this research and obtain mutually satisfactory reports on the results. However, the members of the Headquarters Staff, who are actively engaged in this work, are always available to the Geographic Divisions to discuss in detail the work that is being done and the results that are being accomplished. It was also pointed out that the results of the research work are also immediately available to member companies, through the participation of Headquarters Engineers as advisors to member companies in the solution of current cases.

New Subcommittees

In order that the work of the Development and Research Subcommittee will be more readily available to member companies, several new subcommittees were appointed to study practical phases of the research data that is now available and to prepare serial reports based on this work for the information of the member companies.

MARCH MEETING OF THE ENGINEERING NATIONAL SECTION:

Arrangements have been made for the group meetings of the Engineering National Section to be held at the Edgewater Beach Hotel in Chicago on March 10th, 11th, 12th and 13th. The schedule of meetings will be approximately the same as for the Pittsburgh meetings. Committee Chairmen will be furnished a corrected schedule shortly.

Meter Committee Meeting

A. S. ALBRIGHT, *Chairman*

THE first regular meeting of the National Meter Committee for the current year was held at Pittsburgh, Pa., on Oct. 2 and 3.

The meeting was devoted to a discussion of operating problems in connection with metering, a complete reorganization of the committee and the discussion of subcommittee reports.

The following were subjects for much consideration and the exchange of valuable information.

Lightning Protection for Low Voltage Meters.

The Application of Curves in Transformer Testing.

The Use of Extended Load Characteristics of Watthour Meters.

Two-Rate Metering.

Insulation Test on Meters.

The Use of Three-Wire Current Transformers.

The Engineering Subcommittee was authorized to begin the preparation of specifications for dielectric tests of the insulation of watthour meters.

A number of serial reports were reviewed and advanced for publication.

There were 34 in attendance in addition to the representatives of the meter manufacturers.

A program for the year was developed under the direction of Chairman Albright, which includes a number of important investigations in connection with watthour meters as well as metering and service equipment.

Prime Movers Committee Meeting

R. D. DEWOLF, *Chairman*

THE meeting of the Prime Movers Committee held at Pittsburgh, Pa., Sept. 30 and Oct. 1 was attended by a total of 62 counsellors, members, alternates and guests.

This being the first meeting of the year the general organization of the committee and methods of presenting preliminary and final reports were discussed at some length. A new method of presenting preliminary reports was agreed upon whereby subcommittee chairmen will present a typewritten outline of the work to be covered which we believe will reduce the amount of time required in presentation of such reports. Some changes in the method of presentation of final reports were also discussed and the essential features brought to the attention of the committee.

Preliminary reports were presented by the following sub-committees:

Boiler and Turbine Room Instruments,
Burning of Liquid and Gaseous Fuels,
Coal and Ash Handling,
Condensing Equipment,
Oil and Gas Machines,
Treatment of Feed Water,
Power Station Chemistry,
Station Piping,
Pulverized Fuel,
Stoker Equipment and Furnaces,
Turbines,
Foreign Developments,
Boilers, Superheaters and Economizers,
Distillation Products of Coal.

It was decided that the Turbine Subcommittee should collect operating data on large machines each year, instead of every two years. Many of the companies have adopted forms for keeping their operating data which conform with the requirements of the Turbine Subcommittee so that this data can be easily transcribed to the Turbine Subcommittee forms which will be sent out about the end of the calendar year.

The value of Round Table discussion was emphasized and it was decided to appoint a subcommittee to take charge of the preparation of matters to be brought up for discussion.

Mr. Grunert presented an interim report on Pulverized Fuel explosions supplementing the report previously sent out to all committee members.

The Geographic Divisions were unusually well represented and ample evidence was given of the increasing activity of this line of work. Brief reports and discussions of the work of these Geographic Division Prime Movers Committees were presented by representatives of the following divisions:

Southeast Division,
Pacific Coast Division,
Great Lakes Division,
Southwest Division,
East Central Division,
Eastern Division,
Middle West Division,
Northeast Division.

Upon invitation of the chairman, Mr. Hopwood and Dr. Hall of the Hall Laboratories, Inc., discussed the research work done by Dr. Hall on Feed Water Treatment. Following Mr. Hopwood's address a vote of thanks was extended by the committee to Dr. Hall and Mr. Hopwood for appearing before the Committee.

The next meeting of the committee will be held in Boston Nov. 18 and 19.

Underground Systems Committee Meeting

G. B. McCabe, *Chairman*

The Underground Systems Committee held its initial meeting for the Administrative Year of 1929-1930 in conjunction with the Group Meeting of the Engineering National Section at the William Penn Hotel, Pittsburgh, Pa., on Oct. 2 and 3, 1929. Three half-day sessions were devoted to discussions and one half-day session was spent in inspecting the plants of nearby industries and interesting installations on the system of the local operating company. The total attendance at the meeting was 99 (consisting of 41 members, 8 Geographic Division representatives, 14 manufacturer's representatives and 36 guests). The above 63 members present represent 61 per cent of the total official membership.

The first part of the meeting was devoted to an outline of the plans and reorganization of the committee work by Chairman G. B. McCabe.

Committee Organization

While it is planned to maintain practically the same subcommittees, these will be divided into three groups: namely, the Construction, Operating and General, for the purpose of more efficient administration. The organization of the committee is as follows:

Chairman, G. B. McCabe; *Vice Chairman,* C. T. Sinclair; *Secretary,* L. F. Hickernell.

Construction Group — Chairman, C. N. Rakestraw; Vice Chairman, A. F. Randolph.

1. A-C Networks Construction Subcommittee—Chairman, M. T. Crawford.
2. Cable Installation Subcommittee—Chairman, G. M. Miller.
3. Cable Joint Design and Construction Subcommittee—Chairman, C. W. Franklin.
4. Conduit and Manhole Construction Subcommittee—Chairman, C. E. Hickey.
5. Standardization of Fittings for Manhole Equipment Subcommittee — Chairman, L. G. Smith.

Operating Group — Chairman, T. H. Haines; Vice Chairman, C. H. Kraft.

1. A. C. Networks Operation Subcommittee —Chairman, H. S. Davis.
2. Cable Operation Subcommittee—Chairman, H. Halperin.
3. Conduit and Manhole Temperature Subcommittee—Chairman, J. A. Brooks.
4. Cable Sheath Damage and Protection Subcommittee—Chairman, N. E. Buck.
5. Inspection and Testing of Cables Subcommittee—Chairman, F. M. Farmer.

General Group (Reporting direct to Chairman)

1. Impregnated Paper Insulated Cable Research Subcommittee—Chairman D. W. Roper.
2. Underground Systems Reference Book Editorial Staff—Chairman C. T. Sinclair.
3. Geographic Division Coordination Subcommittee—Chairman, J. W. Sylvester.
4. Editing Subcommittee—Chairman, C. T. Sinclair.

The chairman of the subcommittees, together with the past chairmen of the main committee now form an executive committee, the purpose of which is to assist the chairman in deciding upon methods of policy, to relieve the main committee of detailed consideration of reports and other routine matters and in general to act as a steering committee to the main committee.

Scheduled Meetings

It is planned to hold a two day meeting on Jan. 21 and 22 at Washington, D. C.

Programs for Meetings

There will be presented at each meeting of the committee, one or more papers dealing with novel and interesting installations and methods.

It is also planned to devote one-half day session to exchanging operating experiences among the members of the committee in a meeting limited to the members-at-large only.

Geographic Division Coordination

To effect closer coordination with the work of the several Geographic Division committees and to avoid duplication of effort, a Geographic Division Coordination Subcommittee was formed with Past-Chairman J. W. Sylvester as Chairman, and the Geographic Division representatives as members.

Editing Subcommittee

At the suggestion of the Section Chairman, an Editing Subcommittee. whose duties shall be to pass on the form and general make-up of all committee reports, was appointed.

Secondary Cable Fault Tests

E. W. Oesterreich, Duquesne Light Company, presented a very complete paper on the results of a series of tests made to determine the relation between the amount of current and the time required to burn in two various sizes of conductor when subjected to a copper-to-copper short circuit as may be experienced in a-c network installations.

Reel Standardization

H. G. Hurd, Chairman of the Reel Standardization Subcommittee of the Insulated Power Cable Engineers Association, announced that the reel standards developed by the association and presented to the committee last year had been put into effect and that a trial installation was also being made with steel reels. Considerable advantage is expected to be gained in the use of the steel reels in view of the less storage space required and the reduction in freight costs in returning them to the manufacturer.

Fittings for Manhole Equipment

L. G. Smith, Consolidated Gas, Electric Light and Power Company, Baltimore, Chairman of the Standardization of Fittings for Manhole Equipment Subcommittee, presented a report of the survey to determine the existing designs made by his subcommittee. This survey showed that there were a great many varieties of designs of this equipment for accomplishing the same purpose. It is hoped to develop a set of suggested specifications so that apparatus commonly replaced may be changed with the minimum amount of installation changes.

Underground Systems Reference Book

C. T. Sinclair, Byllesby Engineering and Management Corporation, Pittsburgh, Editor-in-Chief of the Editorial Staff of the Underground Systems Reference Book, reported that the manuscript for the Reference Book will be completed by the first of November. It is accordingly expected that the book will be available for distribution the latter part of next year.

Ventilation of Manholes

J. W. Sylvester, Philadelphia Electric Company, presented a summary of the answers to a questionnaire on the ventilation of manholes compiled from replies by thirty-seven companies. This summary indicated that a large majority of the companies considered ventilation necessary but that methods for accomplishing it vary widely. Most of the companies also indicate that ventilation materially improves their underground system operation. This data has been turned over to the Subcommittee on Conduit and Manhole Construction for further study and use.

Subcommittee Plans

A portion of one of the sessions was devoted to an outline of the work of each subcommittee by its chairman. As customary, the reports of these subcommittees will be presented at the following meetings of the main committee and an effort will be made to circulate the reports at least two weeks prior to the meeting so that an adequate and thoughtful discussion of the subject and material will ensue.

A-C Electrolysis

K. W. Miller, Commonwealth Edison Company, presented an informal paper on some of the results of an investigation by his company on the effect of a-c electrolysis on lead sheaths of single conductor cables on three phase circuits. This study was undertaken to determine the resistance of the sheath and fire-proofing to ground in order that the voltage existing on the sheath may be calculated. The rope sometimes used in fire-proofing when laid directly against the lead sheath was found to be detrimental since it allows electrolyte to get near the sheath and thus increase the corrosive action. The use of non-impregnated asbestos tape next to the sheath was found to be the best practice. No observable corrosion on the cables in the duct was discovered, all of it taking place underneath the fire-proofing. No trouble at the duct mouth due to corrosive action was experienced.

In general they believe that 12 volts is not objectionable for stone ducts when using commercially-pure lead sheaths. However, some of the newer oil-filled cables are provided with a sheath of an alloy lead containing antimony or tin, and in these cases the value of permissible potential may be somewhat different.

Operating Experiences

A half-day session was devoted to a discussion and exchange of operating experiences, the attendance being confined to members-at-large. Some of the subjects under discussion were: (1) Corrosion of transformer tanks (2) Solder-seal type of potheads and joints (3) Backwater Valves (4) Electrolysis (5) Fiber Duct (6) Use of non-leaded cables in ducts (7) Oil filled type of station outdoor potheads, and (8) The practice of using a bare copper neutral on 4 kv. Systems.

Overhead Systems Committee Meeting

SYDNEY ALLING, *Chairman*

THE fall meeting of the Overhead Systems Committee was held at the William Penn Hotel in Pittsburgh on Sept. 30 and Oct. 1 with an attendance of 80 members and visitors. This meeting was preceded by a meeting of the Executive Committee held on Sept. 29 at which time action was taken changing the names of the four main subdivisions of the committee from "Subcommittees" to "Groups." The subdivisions of Groups will hereafter be known as "Subcommittees."

The first day of the meeting was given over to group and subcommittee reports, and an interesting talk by Mr. J. R. Coolidge of the Montan Treating Company, on the Montan Process of Timber Preservation.

This was followed by a general discussion of subjects of vital interest to members of the Overhead Systems Committee.

Reports were made for the following subcommittees:

Distribution Group

- Distribution Design
- Line Construction Operating Methods
- Joint Use Specifications
- Line Construction Organization Methods

Safety Rules Group

Materials and Equipment Group

- Wood Preservation
- Hardware, Insulators and Wire
- Distribution Transformers
- Protective and Switching Devices
- Material Inspection
- Construction and Maintenance Equipment and Methods
- Construction Specifications

Transmission Group

- Maintenance Equipment and Methods
- Marking and Lighting Transmission Lines
- Insulator Research
- Operating Records
- Operating Procedure
- Steel Tower Transmission

The morning session of the second day was taken up by illustrated talks by L. F. Heckmann of the South Bend Works of the Westinghouse Electric & Manufacturing Company on the Manufacture of Hollowspun Concrete Poles and by W. W. Lewis of the General Electric Company and J. H. Cox of the Westinghouse company on the lightning research being conducted by these companies on transmission lines of power companies.

These talks, including the one given by Mr. Coolidge, were of great interest and were followed by numerous questions and interesting discussions.

The afternoon of the second day was devoted to inspection trips to points of general interest to Overhead Systems Committee members.

On the evening of Sept. 30, a dinner meeting was held for the Geographic Division representatives. Ten of the twelve divisions were represented and programs for the coming year were discussed.

The winter meeting of the Overhead Systems Committee will be held during January, the location and dates to be announced later.

Power Systems Engineering Committee Meeting

L. W. W. MORROW, *Chairman*

DURING the past year this committee confined its work largely to the development of the principles to apply in the development of a master plan for a utility system whereby the future could be measured in some degree. At the first meeting of the administrative year, held in Pittsburgh, with an attendance of 70 men, a general discussion of the work for this year was had. It was decided that a few subcommittees could clarify and make tangible the several features of the master plan and these were appointed and the scope of their work outlined.

As part of the program for the year, it was proposed that several utility systems be described and discussed by the committee as a whole so that the diversity of service and load conditions could be outlined fully. At the next meeting in Chicago on Jan. 16 and 17, a feature of the sessions will be these discussions of properties.

The subcommittee on interconnection outlined the scope of its work at the Pittsburgh meeting in general terms as follows:

1. How should a survey of interconnection possibilities for a given system be made?
2. What yardsticks may be established for interconnection?
3. What policies should be recommended?
4. What principles should be established in preventing troubles and operating difficulties?
5. What are the principles for contracts and agreements?

At the final session of the committee, E. C. Stone outlined the budgeting and planning work of the Duquesne Light Company and W. J. Lyman discussed the layout of the system. J. S. Jenks spoke on the duties of the engineer and stressed the need for the use of the economic point of view and the necessity for taking the future into consideration.

Kemp Appointed to Work on Research Organization

MR. W. V. A. KEMP has been attached to the engineering office at N.E.L.A. headquarters to devote himself to the organization of research projects within the scope of the Research Committee of the Engineering Section. A notice of the program of this committee appears in this issue.

Mr. Kemp has been the director of the Committee on Heat Transmission of the National Research Council, and he will continue this activity concurrently with his work in the N.E.L.A. He may be reached at the former office, 40 West 40th Street, New York, or through the N.E.L.A. headquarters office.

Outline of Work of the Meter Committee in 1929-1930

A. S. Albright, *Chairman*

DURING this year the Meter Committee will direct its attention along three general lines:

1. Standardization of Meters and Metering Equipment.
2. New Developments in Metering Methods and in Equipment.
3. Educational Work and Training Courses for Metermen.

Standardization within reasonable limits, is an aid toward economy and simplification. The committee has always had the hearty cooperation of the various manufacturers toward this end, and this condition will undoubtedly continue. Recent improvements in design and construction have placed watthour meters, instrument transformers and their allied equipment on a plane where additional betterments are difficult. Certain changes may be worked out, however, tending toward uniformity of installation facilities. Outdoor metering has received considerable attention recently and the committee hopes to see a fairly standard scheme adopted where such metering is advisable.

The announcement of *New Developments,* both in methods of metering, and in available equipment has always been one of the principal duties of the Meter Committee, and is a real service to the industry. New situations are constantly arising which call for out-of-the-ordinary equipment. New rate schedules are drawn or interconnection plans are devised which may require special methods of metering. The committee attempts to keep itself informed of these innovations, and to pass the information along through the media of serial reports or special articles.

In its efforts to educate the metermen, the committee will continue to sponsor the University Short Courses, since the general opinion is that these courses have been a benefit to those who have attended. The completion and further distribution of the correspondence course, on which the committee has been working for the past two years, will be carried on. This course evidently filled a real need, since the distribution to date by the Educational Committee has been quite general. The Handbook for Electrical Metermen is still being sold. It will be necessary to revise this handbook before long, and the committee should study this matter during the year.

Power Level of Telephone Circuits Uuder Study by Joint Committee

THE work of the Joint Subcommittee on Development and Research, in addition to being directed to the more immediate problems which have been mentioned in previous articles, has also been in part directed to questioning the fundamental basis of the design and operation of communication and power systems from the standpoint of their coordination. It is recognized that both must expand and render greater and better service to the public. The power engineer fully recognizes that he must render more continuous service with better voltage regulation than was required a few years ago. Likewise the telephone engineer must supply circuits with higher transmission quality and less noise than those which were acceptable in an earlier stage of the art.

A part of this work of the committee (under Project No. 7) has been a consideration of the magnitude of telephone power flowing over telephone circuits. Evidently the interfering effect of any extraneous noise introduced into a telephone circuit is dependent not so much on its absolute magnitude as on its magnitude relative to the amount of telephone power flowing in the circuit. The telephone power level is affected (1) by the characteristics of the telephone instrument, particularly the transmitter, and the manner in which the telephone subscriber uses this instrument, and (2) by the changes undergone by the currents put out by the transmitter in passing to the telephone central office and then over the circuit to the distant telephone office and from there to the distant subscriber. The committee has reviewed the changes which have taken place in the design of telephone plants over a period of past years and has found that the trend has been toward higher levels.

As regards telephone transmitters the present instruments for a given sound input send out about three times the electrical output of the transmitter of 15 years ago. Incidentally while the power flowing in a telephone line is very small compared to that in power circuits it represents at the sending end a power several hundred times the voice power which actuates the transmitter.

As a possible way of better controlling the power levels on the line the committee has considered in the case of long distance open wire circuits the proposition of applying high powered repeaters since it is these longer circuits on which noise is frequently most troublesome. Certain high powered repeaters were made available for tests and tried out on a considerable scale on the central transcontinental route from New York to San Francisco and brought about the expected noise improvement. Any long distance circuit, however, such as this, has exposures to a large number of shorter circuits. It was found that raising the level on the long circuits resulted in undue crosstalk into these other circuits of the lead. It was concluded that but little application could be made of this remedy without radical changes in the configuration of the open-wire lines. Considerable work is being done in studying the effect of such change in configuration. Another arrangement considered was the use of high powered repeaters applied to all the circuits of a given pole line in sections where unusually severe interference is encountered. The expense of this is such that no cases have been found where it appeared economical as compared to other engineering methods for improving the situation.

A consideration of the line circuits in general has shown, however, that repeaters have already resulted in improvement in the levels of the power in telephone circuits. Of course, the biggest advantage of telephone repeaters from the interference coordination standpoint has been in their making possible the use of long toll cables and open-wire carrier circuits which have removed a considerable part of the coordination difficulties with toll circuits.

1929 REVISION OF NATIONAL ELECTRICAL CODE TO BE KNOWN AS 1930 CODE

On account of the delay in printing the 1929 Revision of the National Electrical Code, which is now not expected to be available until December 1, 1929, or shortly thereafter, the National Fire Protection Association proposes to call the new code the "1930 National Electrical Code." The N.E.L.A. has assented to this proposal.

GEOGRAPHIC DIVISIONS and STATE ASSOCIATIONS

East Central Division Activities

By Thorne Browne

Secretary and Treasurer, East Central Division, N. E. L. A.

OHIO
EAST
CENTRAL
GEOGRAPHIC
DIVISION
W.V.
KY.
N.E.L.A.

The East Central Division of the National Electric Light Association was very active in the celebration of Light's Golden Jubilee. There is probably no other Division in the United States that gave more attention to this event than did our Division. In nearly every city fine celebrations were held, while luncheon clubs and other organizations had special programs which portrayed light's great importance and its effect on humanity.

The work of the standing committees of the Division is in better shape than in any previous year. Under the excellent leadership of the several national section chairmen, the committees have arranged their preliminary work and a schedule of their winter meetings. All chairmen of committees were called together for a meeting at the West Virginia Utilities Association convention, held at Wheeling, October 23 and 24. This is an annual affair and is used more as a clearing house for the standing committee work than for directing the work itself. Conflicts in dates are avoided and correlation of work brought about.

The Accident Prevention Committee has carried on its work throughout the summer, and monthly reports are made covering the campaign on accident prevention. It is very gratifying to know that an improvement in lessening the number of accidents has been brought about.

The Executive Committee of the Division will meet some time in November to fix the time and place of the 1930 convention. The question whether the Division will go to a resort or city will be the principal bone of contention at that meeting. The probabilities are that it will go to a city as it did last year at Louisville.

One of the problems that faces all of the Divisions, and especially the East Central Division, is the matter of avoiding the month of June for a convention. Due to the distance of the National Convention at San Francisco, it will be necessary to leave practically all of the month of June open for those who desire to attend the National convention, and that month is the most desirable month of the year for holding the East Central Division convention, as then it is very beautiful in any of the three States comprising the Division.

In 1922 the convention was held in May and the advantage of a convention that far in advance of the closing of the National Association year was apparent throughout the year's work. But holding our convention earlier than June seriously interferes with getting everything in shape for the National convention. At this writing, if the secretary were to make a guess as to where the convention of 1930 would be held, he would say Cleveland, Cincinnati or Columbus, Ohio.

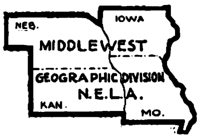
Considerable work is being done along the line of rural service, and a loose-leaf handbook on that subject has just been published. While this initial issue contains only data on water pumping, other data on feed grinding, ensilage cutting and kindred subjects will follow in a short while.

The East Central Division has every hope that the close of the year on June 30 next will witness the passing of the most active year of its existence.

Middle-West Division Activities

By Thorne Browne

Director, Middle-West Division, N.E.L.A.



The month of September and the first half of October saw all committees of all sections completely organized and most of those committees getting lined up for a year of activity.

Meetings have been held and full plans outlined for the year by the Accounting Section, the Rural Electric Service Committee, Public Speaking Committee, and the Women's Committee.

Accounting Section

The Accounting Section met at Kansas City on Sept. 16 with twelve members present. In an all day session, the committees planned their work for the year, dovetailing in with the national activities as they are developed, and developing some interesting data and recommendations for the division itself.

The Classification of Accounts Committee will continue its efforts to have the State of Missouri approve the standard classification and in a mild way to get those member companies who do not now fully follow the standard to make adjustments in that direction.

The Customer Records Committee will continue last year's efforts in development of standard practices on consumers' deposit precedure, machine billing methods, and merchandise billing.

The Fixed Capital Committee will utilize the data obtained last year from a questionnaire in the making of a report and recommendations. The General Records Committee will make a survey of payroll methods and add some recommendations concerning transportation accounting which the same committee studied last year.

The Purchasing and Storeroom Committee outlined rather extensive studies of prevailing practices within the division with a view to preparing a report and making recommendations to member company auditors.

Rural Service Committee

The Rural Electric Service Committee met at Omaha on Sept. 20. This committee is made up of the general chairman and the chairman of each State section committee together with the chairman of the Rural Merchandising Committee of the Commercial Section, the Customer Records Committee of the Accounting Section, and the chairman of the Overhead Systems Committee of the Engineering Section.

This committee undertook, in conjunction with the Accounting Section, to establish member company accounting practices on rural service on such a basis as will be entirely accurate. Chairman Moylan of the Accounting Section has undertaken to deal with this subject, and to that end is already in touch with the auditors of all member companies.

The Rural Service Committee is also sponsoring jointly with the state rural committees a conference, in each of the States of the division, for discussion of rural service problems. The first of these will be held in the late fall.

Standard contracts of member companies for rural service will also be studied by the committee for the purpose of making a report covering the general scope of these contracts with possible recommendations.

Public Speaking Committee

The Public Speaking Committee held its first meeting at Kansas City on Sept. 10 and outlined a plan for a more complete organization. Inquiries have been sent to each member company asking each to designate one individual in that company to be supervisor of public speaking in the territory served by it. Generally, this supervisor has been named. Since the State sections do not have public speaking committees, one member of the Middle-West Division has been named in each State to keep in touch with speaking activities and to secure monthly reports.

Plans are under way for the elimination contests of the National Employees' Speaking Contest.

Women's Committee

The Women's Committee has been very active. A session was held at Kansas City on Sept. 9 at which there was full attendance. Reports indicated complete organization in two of the four States of the division and only local organizations in the other States. Plans were perfected to secure coordination of activity in these two States.

Since the date of the meeting, Chairman Louise Hathaway has held a meeting in each of the two States where the organization was not satisfactory. These meetings were largely attended by representatives of member companies. Bulletins showing the activities of local women's clubs will be published monthly in each of the States and distributed. All are pledged to carry out this year's program activities in accordance with seven points set forth as the goal of the committee. These seven points are:

1. Know the company personnel and the territory served by your company.
2. 50 per cent of the girls to deliver a talk pertinent to the industry, copy of same to be sent to the state chairman for record.
3. Safety First Work:
    25 per cent to have knowledge of prone pressure method of resuscitation.
    75 per cent to have knowledge of first aid emergency methods, viz:—treatment of bruises, cuts, fainting, poisoning.
    100 per cent ideal of safety first.
4. Specific knowledge of initial and maintenance costs, operation and care of two major and five minor appliances.
5. One general meeting including wives of employees.
6. At least one educational meeting on "Rural Electrification."
7. To carry the thread of "Employees' Relation to the Customers" all through the year's program.

Commercial Section

The Commercial Section is continuing its standard activities. During September and the first half of October it distributed widely through headquarters office four sales campaign plans on electric water heaters, one campaign on portable lamp sales, and one on industrial electrical heating.

Great Lakes Division News Letter

By Tom C. Polk

Secretary, Great Lakes Division, N. E. L. A.

WIS
GREAT LAKES
GEOGRAPHIC DIVISION
N.E.L.A.
MICH
IND.
ILL.

The ninth annual convention held at French Lick, Ind., on Sept. 26, 27 and 28, with a registration of 817, was the most successful convention ever held in the Great Lakes Division.

One of the outstanding features was the lighting of the Japanese Garden and hotel grounds in commemoration of Light's Golden Jubilee. This display was in charge of the Lighting, and Light's Golden Jubilee Committees and was made possible by the cooperation of the Manufacturers and the Interstate Public Service Company.

Purdue University held its third annual conference on Rural Electrification in cooperation with the Indiana Electric Light Association, on October 10, 11 and 12. One hundred and thirty-three were registered from nine States. The Rural Electric Service Committee of the Great Lakes Division met during the conference and outlined its work for the year.

The University of Wisconsin held a Rural Electrification Conference on October 31, Nov. 1 and 2. A splendid program was arranged.

The Engineering Section of the Great Lakes Division met at Madison, Wis., on October 23, 24, 25 and 26. After the first general session, the several committees devoted the balance of the time to organization and round table discussions of the year's program of activities. A. D. Bailey, chairman of the Engineering National Committee; G. C. Neff, president, and Tom C. Polk, secretary of the Great Lakes Division, were speakers at the dinner on Thursday night.

The Commercial Section of the Division had its first meeting at the Leland Hotel, Detroit, Mich., on October 28. Plans were made for the second meeting which will be held in Chicago in January and will include an Electrical Advertising School and a Merchandise Sales Conference.

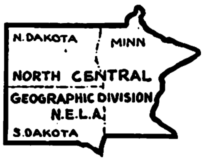
A. E. Scott, chairman of the Public Relations Section, Great Lakes Division, announces a meeting of this section to be held in Chicago in November.

The Great Lakes Division offices will be moved to the new Chicago Civic Opera Building, 20 North Wacker Drive, the last week of November.

North Central Division News Letter

By John W. Lapham

Secretary-Treasurer, North Central Electric Association



The North Central Electric Association started out the activities of the new year with an Accounting Conference, Oct. 28-29, 1929, at the Nicollet Hotel, Minneapolis, Minn. Fred Herbert, Service Director, N. E. L. A. Headquarters; W. R. Emerson, N. E. L. A. Accounting Chairman, Oklahoma City, Okla.; C. E. Packman, Middle West Utilities Company, Chicago; B. F. Braheney, General Auditor, Byllesby Management and Engineering Corporation, Chicago; were some of the out of the district speakers of the occasion J. J. Molyneaux, Treasurer of the Northern States Power Co., Minneapolis, presided as Toastmaster of the banquet which contained many interesting entertainment features.

A. L. Burgess, Northern States Power Co., Chairman of the Accounting Section, presided over the sessions with the help of F. R. Gamble, Minnesota Northern Power Co., vice-chairman of the section.

Other talks at the meeting were as follows: "Credit Practices to Watch," John W. DeMaine, Northern States Power Co., Minneapolis, Minn.; "The Human Side of a Balance Sheet," P. O. Johnson, Northern States Power Co., Minneapolis, Minn.; "Fixed Capital Records," J. A. Hennesey, Northern States Power Co., Minneapolis, Minn.; "Customers' Records," B. McTeigue, Minnesota Power & Light Co., Duluth, Minn.; "Changes in Classifying Accounts," W. L. Hatch, Otter Tail Power Co., Fergus Falls, Minn.; "Improved Practices in Purchasing and Storeroom Accounting," E. G. Kellett, Northern States Power Co., Minneapolis, Minn.; "Changes in General Records Practices," C. L. Sandstedt, Northwestern Public Service Co., Huron, S. D.; "How to Better Use Statistics?" Fred Brown, Northern States Power Co., Minneapolis, Minn.; "The Electrical Situation," John Lapham, Minneapolis.

The program for the year includes the following: Women's Committee Conference, Nicollet Hotel, Minneapolis, Minn., Nov. 22-23, 1929; Commercial Conference, St. Paul Hotel, St. Paul, Jan. 20-21, 1930; Engineering Conference, Nicollet Hotel, Minneapolis, Feb. 24-25, 1930; Managerial Conference, Alex Johnson Hotel, Rapid City, S. D., June 11-12, 1930.

A number of the companies are arranging to enter the Employee Speaking Contest.

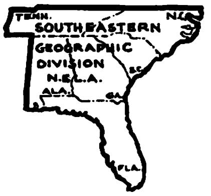
Light's Golden Jubilee was observed quite generally throughout Minnesota, North Dakota and South Dakota. The dome of the State Capitol at St. Paul, Minn., was floodlighted for the first time in its history, and it will probably be continued permanently by the State of Minnesota. Broadcasting conditions were very good throughout the district and a great many of the electrical people invited their friends and neighbors to hear the broadcasting on Oct. 21.

Ninety per cent of the population served by the power companies in the three states have received rate reductions during the past few months and each company is "hitting the ball" very hard on Commercial Sales, with surprisingly good results.

Warm Breezes from the Southeast

By C. M. KILIAN

Executive Secretary, Southeastern Division, N. E. L. A.



Your correspondent hopes that the title of this report will not suggest to any readers of this column that at times the warm breezes may be developing into hot air, for he hopes to confine himself to the facts, uninteresting though they may be. He realizes, of course, that every section in the country will want to show up in the most favorable light and he may, therefore, at times be sorely tempted to stray from the paths of truthfulness. He will, however, do his best to restrain himself.

Considerable interest is being manifested in the Employees' Speaking Contest, although it is not at this time possible to report one hundred per cent participation by member companies.

Unusual interest is being manifested by the women of the Division in a unique competition under which every member of a company women's committee has the opportunity of acquiring honors for herself and her committee.

The Engineering Section held a series of group meetings on October 21 and 22, and the following subjects were thoroughly discussed:

An Exposition of System Planning, as practised in a Large Southern City.
Railroad Crossing Policy—National Development.
Movie of Hydro Plant Construction—Carolina Power and Light Company.
Telephone Protective Practices on Power Line Telephones.
Paper and Discussion on Non-Metallic Lead Sheathed Cable.
National Developments in:
  Electrical Apparatus.
  Inductive Coordination.
  Underground-Overhead Systems.
  Meter Practice.
  Safety Methods.
  Prime Movers.

The two publications of the Division, *Nela-Graph* and *Light Pointers*, continue to have a growing mailing list.

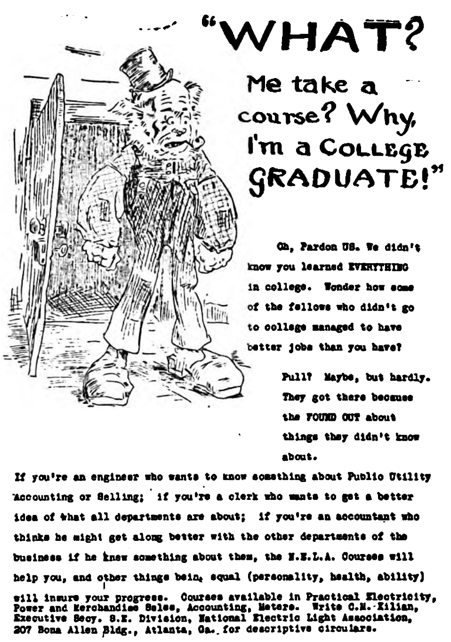
Of particular interest to the executives of the Division have been orders from holding companies for comparatively large quantities of the reports issued by the several committees of the Division.

Of interest to those Association members who have not made full use of the N. E. L. A. Committee reports, are the comments, developed in a recent survey, of those using the reports in this Division. Typical comments follow:

> " . . . . . All of the Engineering reports received are read by almost every engineer of this department and they have been helpful in many ways because they have given us a somewhat broader aspect in our daily endeavors than we would have had, had we not received them . . . . ."
>
> " . . . . . The report on Neon Sign Metering will be of particular help to our Company . . . . ."
>
> " . . . . . I study the points brought out in the N. E. L. A. reports closely and attempt to use such ideas we find in them in our business . . . . ."
>
> " . . . . . The experimental and new installations in the industry have been of value in solving some of our problems by pointing out ways of bettering efficiency or by preventing duplication of unsuccessful experiments which would be the case if we were not kept advised of the efforts of others . . . . ."
>
> " . . . . . The reports in bringing out practices of other companies have indicated ways of improving existing methods of handling certain work . . . . ."

There were fifty-two other comments received. All of them testimonials outlining some particular way in which the reports have been beneficial.

The Divisional office has inaugurated a plan for distribution of a series of bulletins on the N. E. L. A. Educational Courses for posting on member company bulletin boards. This has resulted in greatly increasing the number of inquiries concerning these courses. (Two of these bulletins, greatly reduced, are reproduced herewith.) Samples of these bulletins may be had upon request to the secretary of the Southeastern Division, 207 Bona Allen Building, Atlanta, Ga.

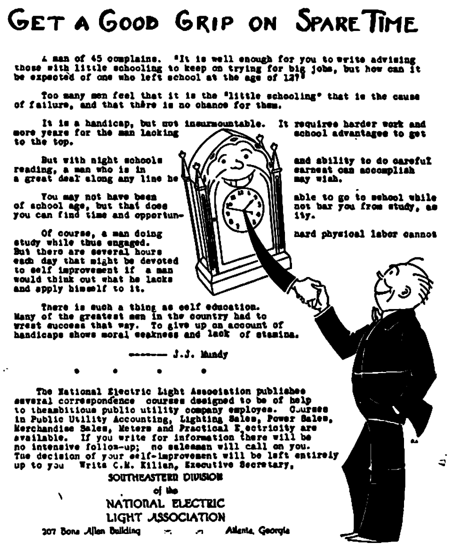


"WHAT? Me take a course? Why, I'm a COLLEGE GRADUATE!"

Oh, Pardon US. We didn't know you learned EVERYTHING in college. Wonder how some of the fellows who didn't go to college managed to have better jobs than you have?

Pull? Maybe, but hardly. They got there becuase the FOUND OUT about things they didn't know about.

If you're an engineer who wants to know something about Public Utility Accounting or Selling; if you're a clerk who wants to get a better idea of what all departments are about; if you're an accountant who thinks he might get along better with the other departments of the business if he knew something about them, the N.E.L.A. Courses will help you, and other things bein, equal (personality, health, ability) will insure your progress. Courses available in Practical Electricity, Power and Merchandise Sales, Accounting, Meters. Write C.M. Kilian, Executive Secy. S.E. Division, National Electric Light Association, 207 Bona Allen Bldg., Atlanta, Ga. for descriptive circulars.



GET A GOOD GRIP ON SPARE TIME

A man of 45 complains. "It is well enough for you to write advising those with little schooling to keep on trying for big jobs, but how can it be expected of one who left school at the age of 12?"

Too many men feel that it is the "little schooling" that is the cause of failure, and that there is no chance for them.

It is a handicap, but not insurmountable. It requires harder work and more years for the man lacking school advantages to get to the top.

But with night schools and ability to do careful reading, a man who is in earnest can accomplish a great deal along any line he may wish.

You may not have been able to go to school while of school age, but that does not bar you from study, as you can find time and opportunity.

Of course, a man doing hard physical labor cannot study while thus engaged. But there are several hours each day that might be devoted to self improvement if a man would think out what he lacks and apply himself to it.

There is such a thing as self education. Many of the greatest men in the country had to wrest success that way. To give up on account of handicaps shows moral weakness and lack of stamina.

——— J.J. Mundy

• • • •

The National Electric Light Association publishes several correspondence courses designed to be of help to theambitious public utility company employes. Courses in Public Utility Accounting, Lighting Sales, Power Sales, Merchandise Sales, Meters and Practical Electricity are available. If you write for information there will be no intensive follow-up; no salesman will call on you. The decision of your self-improvement will be left entirely up to you Write C.M. Kilian, Executive Secretary,

SOUTHEASTERN DIVISION
of the
NATIONAL ELECTRIC
LIGHT ASSOCIATION
207 Bona Allen Building Atlanta, Georgia

The Southeastern Divisional office took a leading part in the organization and direction of the Atlanta celebration of Light's Golden Jubilee. With the revelation that Ye Scribe, in addition to his many hitherto known talents, is also an able (?) orator of note. He has found himself so busy delivering eulogisms on Thomas Edison, electric refrigeration, the Value of Cooperative Effort and the Rightful Place of the Fair Sex (in the home, on the street or in the office), that he has thown away his quill and duster and bought a megaphone instead.

On one occasion he addressed a group of boys who were inclined to be rather noisy, so he shouted:

"You kids are making so much noise I can't hear what I am saying."

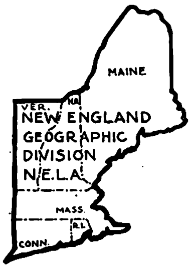
One of the little rascals shouted back:

"That's all right, Mister, you aint' missing nuthing."

New England Division Activities

By O. A. Bursiel

Secretary, New England Division, N. E. L. A.



Members of the New England Division were grateful for the opportunity to do their part in the celebration of Light's Golden Jubilee, and to join with the entire world in honoring its great leader, Thomas Alva Edison. Many cities and towns throughout New England joined in this celebration with special exercises, illumination and floodlighting of buildings. The Boston observance centered about Copley Square. The Public Library, Trinity Church and Copley Plaza Hotel were floodlighted for an entire week. Many of Boston's largest buildings were illuminated on the evening of Oct. 21. The State House, the Massachusetts Institute of Technology in Cambridge and the buildings in the Harvard University Yard all were floodlighted at night.

Now the Division is all agog with the possibilities of the Employees' Public Speaking Contest. State and Geographic committees have been appointed. At a meeting of the Geographic Division Committee, plans were made for the holding of the Geographic Division contest in a central location; judges are being selected; one State has its plans all formed and well under way, and New England is all "set to go."

The new conference room adjoining the Division's headquarters is already proving a very desirable and popular meeting place for the various committees of the Division.

The chairman of the Public Relations Section of the Division, L. D. Gibbs, The Edison Electric Illuminating Company of Boston, held a meeting of his several chairmen on Wednesday, Oct. 23, at which time plans were made for an all-day meeting of the Section to be held at the Copley Plaza Hotel, Boston, on Nov. 14. A most interesting program for the day was outlined.

Messrs. Sloan and Sampsell at French Lick Springs

Great Lakes Division Convention

With an attendance of 817, the Great Lakes Division held an usually fine convention at French Lick Springs, Ind., Sept. 26-28. A feature of the convention was the address by M. S. Sloan, president of the N.E.L.A.

Discussing the matter of utility mergers, Mr. Sloan said the reorganization of the electric utility industry into larger units was a natural process justified by changes in the technique of operation and management. It has not been and is not now in every case true that consolidation and combinations are properly conceived and executed, but as a general thing they are. The trouble is that the virtues of the reintegration of the industry are not clear to the public, a condition that must be corrected. (The complete text of Mr. Sloan's address was published in the October issue of the N. E. L. A. Bulletin.)

G. C. Neff, president of the division, made a strikingly good presentation of the political aspects of the utility business and concluded with a strong plea for earnest efforts to reach public understanding.

Paul S. Clapp, managing director N.E.L.A., followed Mr. Neff with an inspiring recital of the growth of the industry and of its growing importance in the homes of the nation. Mr. Clapp summed up the political and economic forces that now engage the attention of the industry.

C. F. Hirshfeld of the Detroit Edison Company, spoke on the value and necessity of research in the electricity supply industry. He said that only 10 per cent of the money spent in research is directed toward the investigations in pure science which must be the foundation of the applied science of the future. As a result applied science is on the way to bankrupting itself.

Marshall E. Sampsell, chairman of the Commercial National Section, linked together the two matters of electrical merchandising and customer ownership of utilities securities. Customer-owners should, he said, on account of their financial interest in the company be most responsive to efforts made to extend the use of electrical service.

A summation of the sources of information in the electric light and power field was presented by Edwin J. Fowler, Commonwealth Edison Co.

Basing his statements on the analysis of 41 circulars referring to as many security offerings of public utilities, George C. Mathews of the Wisconsin Railroad Commission said that the selling practices indicated by information indefinitely presented or in some cases left entirely out of these circulars were such as to bring the operations almost within the province of the "blue sky" laws of many states. It is only by taking account of and correcting these conditions that the utilities can assure to themselves the continuous flow of capital which is necessary for their growth.

A. D. Bailey, chairman of the Engineering National Section, told of the need for the engineer to consider his work in a broader view and to appreciate the economic and humanitarian aspects of his profession.

Other papers listened to with much interest concerned rates, competition and power sales, industrial development activities, customer relations, lighting service, lamp sales and other subjects. A feature of the convention which must have provided many of those who saw it with inspiration for the celebration of "Light's Golden Jubilee" was the illumination of the Japanese gardens of the hotel. This work was done under the direction of the lighting committee of the division by the Interstate Public Service Company with equipment loaned by the manufacturers.

WOMEN'S COMMITTEE

Miss Sara Harris, *Chairman* **Miss Isabell L. Davie**, *Secretary*

News Letter

By Mrs. Thelma Van Ness
Publicity Chairman

A REPORT of the recent meetings of the Central Power & Light Co., San Antonio, Tex., shows that each of the eight districts is carrying on very active committee work. Current events regarding the industry are given by each member at every meeting and in some meetings a number of questions on company activities are answered. The use of appliances and job analysis are two topics which are given particular attention in these groups. Miss Alice Schuetze is the chairman.

* * *

The Avoca Live Wires, according to the Iowa-Nebraska Light & Power Company bulletin, *Live Wire Newsette,* recently voted to send a letter of welcome to each of the teachers in the Avoca Public Schools. These teachers are to be invited to meetings of the Women's Committee from time to time.

* * *

A recent issue of *The Oklahoma Meter,* Oklahoma Gas & Electric Co., published a story of a clever program at Sapulpa, Okla., celebrating Light's Golden Jubilee. The Women's Committee meeting was held in a studio setting and Mr. Edison was the honored guest—by proxy. Miss Gayle Bolner acted as announcer and Miss Lela Scott and Miss Thelma Dorr impersonated Graham McNamee and Phillips Carlin, respectively. An idea of what was to happen on the night of Oct. 21, when the greatest hook-up of radio stations ever attempted, paid homage to Mr. Edison and his incandescent lamp, was given. Edison's life history was related by members of the committee, each taking her place before the "mike," telling the important incidents and enumerating his inventions. Miss Opal Cobbs concluded the program, singing "Edison, The Miracle Man."

This program proved such a sensation that the girls were asked to repeat it for the Rotary Club of Oct. 15 and again at a joint meeting of all the Civic Clubs on Oct. 21.

* * *

The Women's Committee of the Birmingham (Alabama) Electric Company, of which Miss Ethel Bilbrey is chairman, recently assisted Miss Earline Hutcheson, Birmingham Electric Company Home Economist, in serving a luncheon to about 125 members of the Kiwanis Club of Birmingham, Ala. The subject of the principal talk at this luncheon, which was made by T. G. Brabston of the Birmingham Electric Company, was Light's Golden Jubilee. Members of the Women's Committee sang several songs, including "Edison The Miracle Man."

* * *

Miss Mary K. Walsh, The Washington Water Power Company, was in charge of the entertainment and arrangements for the annual meeting and banquet of the Spokane Business and Professional Women's Club, Sept. 10. Miss Walsh served as vice-president of the club during the past year.

* * *

A rather special meeting of Seattle Women's Committee, Puget Sound Power & Light Company, was held in September. Following the regular luncheon, the question, "Resolved: That Personal Contacts With the Public by Our Employees Are More Effective In Creating Public Opinion Than All Other Means of Publicity," was debated by competing teams of the committee. The judges were Otto L. Luther, principal of Queen Anne High School, C. E. Mong, manager of Pacific Telephone & Telegraph Co., and Miss Lulu Moulton, president of Seattle Business and Professional Women's Club, who decided in favor of the negative side. The Glee Club furnished music during the intermissions. A number of the officials of the company were present, including A. W. Leonard, president. It was the unanimous opinion that the meeting was a very interesting one.

The Seattle Committee recently entered their First Aid Team in the state-wide safety meet held in Seattle, winning second place in the contest. The team was highly complimented on its splendid work after being in preparation for the contest but a few weeks.

Bowling is quite the order of the day in the Seattle Committee at present. Twenty-four of the members are formed into four teams and are playing a series of competitive games. It is believed that this association is contributing a great deal in improved relationships among the groups.

Wenatchee Women's Committee, Puget Sound Power & Light Company, entertained Mrs. Nell Laws, Company Chairman, at their September meeting, Mrs. Laws contributing to the program by giving a resume of her trip to Atlantic City and of Women's Committee matters in general.

* * *

Mrs. Jeannette I. Rees, chairman of the Southern California Edison Company Women's Committee at Los Angeles, has announced an "Appliance Education Contest," which will be concluded at the November meeting. Prizes will be awarded. The idea of this campaign of education among the girls is to stimulate interest in appliances as every girl will be, in some measure at least, a salesman among her friends. Mrs. Rarick, of the Commercial Department, will handle the detail of this campaign. Information on various appliances was distributed among the girls with the thought that they study this data preparatory to taking an examination at the October meeting. The November meeting will feature the cooking of an "Electrical Dinner."

At the September meeting of this group, which was attended by 225 girls, five cash prizes were awarded essay writers ranking next to Mrs. Vauchelet, who won the first prize in the Pacific Coast Electric Association contest. The awarding of these prizes to the company girls was a surprise arranged by Mrs. Rees.

* * *

According to *Ye Club Chatter,* Illinois Power Company Women's Committee bulletin, Springfield, Mrs. Jessie Hunsley, chairman of the group, and also Illinois State Chairman, with Miss Edna Heermans, spent the day, Oct. 3, at the farm home of John Scherf, serving waffles, coffee and pop corn and explaining the various small appliances to all farmers and their wives who were interested. This was in connection with new rural extensions.

* * *

The Women's Committee of the Memphis Power & Light Co., at Memphis, Tenn., combined business with pleasure at a recent outing held at Overton Park. At four o'clock a special street car pulled away from the car barn, carrying Street Railway girls and Distribution Building girls up to the smaller building to pick up the girls there. Other girls rode out in automobiles and there were seventy-five girls present when Miss Favo Montgomery, the chairman, called the meeting to order. Miss Oma Buchanan, State Chairman, was the speaker of the day and following her talk, the Entertainment Committee took charge of the dinner which had been prepared by Mrs. Shaw and her helpers.

* * *

An excellent method of stimulating Women's Committee activities, and of giving to women working within the industry an insight into general industry matters, is that employed by the Women's Committee, Wisconsin Utilities Association. This committee holds a yearly conference for utility women in Wisconsin. The following program of the 1929 Women's Conference is especially interesting:

Thursday Morning, Sept. 19, 1929

Address of Welcome—Ewald Haase, Milwaukee Gas Light Company.

Response—Skulda Baner, Lake Superior District Power Co., Ironwood.

Chairman's Remarks—Ruth C. Tarum, Northern States Power Company.

Address—"Being Informed About Our Business"—E. J. Steinberg, Chairman Employees' Education Section.

Discussion led by Lyndia Hollenbeck, Wisconsin Michigan Power Company.

Four-Minute talks on the general subject "The Opportunity in My Job for Serving the Public."

Cashier—Mary Blecha, Wisconsin Valley Electric Company.

Telephone Operator — Margaret Frey, Wisconsin Gas & Electric Company.

Transportation—Meta Erdman, Wisconsin Michigan Power Company.

Purchasing Department—Marian G. Crowell, Milwaukee Gas Light Company.

Merchandising and Complaints — Agnes Larson, Menominee & Marinette Light & Traction Company.

Thursday Afternoon

Address — "Taxes" — C. E. Kohlhepp, treasurer, Wisconsin Public Service Corp., Milwaukee.

Discussion led by Lillian Minch, Wisconsin Power & Light Company, Madison.

Address—"What the Farm Housewife Is Doing with Electricity"—Vera B. Meacham, Wisconsin Power & Light Company, Madison.

Discussion led by Mildred Manley, Wisconsin Power & Light Co., Lake Geneva.

Trip through the Public Service Building, Milwaukee, featuring electrical Home. Merchandise, Store, Home Service Department, Customers' Hall, Machine, Accounting and Educational Departments. (Property of The Milwaukee Electric Railway & Light Company.)

6.30—Annual Dinner

Entertainment program arranged by the Local Arrangements Committee with the cooperation of the various member company delegates. The program included skits, musical numbers and other entertainment features.

M. H. Frank, Vice-President of the Association (with the Wisconsin Power and Light Company) presided at the dinner.

Friday Morning, Sept. 20, 1929

Address — "The Utility Spirit" — Helen Welsh, Northern States Power Company, Eau Claire.

President's Message—G. W. Van Derzee, President, Wisconsin Utilities Association (with The Milwaukee Electric Railway & Light Company).

Address—"Tales of Mystery and Imagination"—Vera B. Ellwood, The Milwaukee Electric Railway & Light Company.

Address — "Employees' Training Programs"—Monica Guenther, Wisconsin Public Service Corporation, Milwaukee.

Four-Minute talks on the general subject "The Opportunity in My Job for Serving the Public."

Switchboard—Esther M. Tietz, Switchboard Operator, The Milwaukee Electric Railway & Light Company.

Merchandising—Leila Nicla, Wisconsin Power & Light Company, Sheboygan.

Cashier—Grace LaFleur, Wisconsin Power & Light Company, Beaver Dam.

Report of Judges of Women's Contest—May S. Fletemeyer, Northern Indiana Public Service Company, Hammond, Indiana.

Friday Afternoon

Address—"Light's Golden Jubilee"—Betty Handel, Madison Gas & Electric Company.

Address—"Romance of Power"—A. A. Engelhard, The Milwaukee Electric Railway and Light Company.

Address—G. C. Neff, Wisconsin Power & Light Company, Madison.

National Women's Committee Meeting

A MEETING of the 1929-30 National Women's Committee was held at the Drake Hotel, Chicago, Sept. 23, with twenty-five of its thirty-one members present.

Reports indicated that Women's Committee work is being carried on with increasing effectiveness in all of the Geographic Divisions of the N. E. L. A., and new committees are being organized.

The committee approved the preparation of an educational program for the use of all Women's Committees, to be published at the earliest possible date.

Home Service Subcommittee

Miss Ada Bessie Swann, chairman, Home Service Subcommittee, reported that plans have been made by her group for a more active program than ever before. It is planned to include in the membership of the Home Service Committee men representatives from the Commercial Section, Public Relations Section and others who will bring to the Home Service activity a viewpoint necessary to its proper growth. A tie-in will be made with the American Home Economics Association.

Miss Swann explained that the Manual on "How to Organize and Operate a Home Service Department in an Electric Public Utility Company," which the committee is compiling, would be ready for distribution within the next few weeks. This will form the ground work for the greater activities of the Home Service Committee for 1929-30. Miss Swann told of the plans for developing at N. E. L. A. Headquarters files of material to take care of the requests which come in on many phases of Home Service; first the requests that come from executives wishing to organize Home Service Departments, and, second, requests from departments already organized, seeking assistance in preparing programs, etc. Home Service Tales, the publication of the Home Service Committee, will be continued this year, and will attempt to include more items of assistance to Home Service Directors. A series of articles on Home Service will be prepared for publication in various magazines of the industry. These articles will attempt to bring to the attention of executives within the industry the real purpose of Home Service and the benefits to be derived therefrom. Emphasis will be laid this year on developing programs of Home Service which will bring out all the uses of electricity in the home. Miss Swann said that conferences of Home Service Directors will be held in various parts of the country.

Manufacturers Subcommittee

Miss Frances Weedman, chairman, reported that the plans of the Manufacturers Committee are:

1. To assemble educational material on electric household equipment in the form of a display which will be used in connection with N. E. L. A. conventions and meetings. It will not be sent to individual companies. A list of the material contained in the display will be distributed from Headquarters.
2. To cooperate in the projects of the Women's Committee educational and Home Service groups by furnishing displays, bibliographies and lecturers and demonstrators. Details to be announced.
3. To compile special study sheets on various appliances, to be used for educational studies, short courses, etc.
4. To compile a glossary of electrical household equipment terms. This work will be done under the direction of the Manufacturers Subcommittee, with the assistance of Women's Committee, Home Service, trade magazines, National Electrical Manufacturers Association and National Electric Light Association Headquarters' representatives.

Safety Subcommittee

Miss Esther Rockey, chairman, Safety Subcommittee, reported that suggestions for Safety and First Aid activities for Women's Committees would be prepared for publication in the general Women's Committee educational program, and would be supplemented with suggestions by letter during the year. She urged the organization of Safety

(*Continued on page 756*)

RELATED and other ORGANIZATIONS

Power Group, Metropolitan Section of the A. I. E. E. Announces Program for the Year

MR. G. E. SUTHERLAND, Chairman of the Power Group of the Metropolitan Section of the A. I. E. E., has announced the following program of meetings for this season:

October 30—Generation and Development of Generators.

December 9—Systems Connections.

March 11—High Tension Transmission Cable.

May 13—High Tension Overhead Transmission.

Four groups—namely, Power, Illumination, Transportation and Communication—were organized last year for the purpose of affording young engineers an opportunity to take an active part in the proceedings of the Institute. It was felt that such groups would fill an important gap between the student groups and the senior organization.

At the regular meetings, due to the number of subjects discussed and the limited time available, it is seldom possible for the younger engineers to enter into the discussion.

From the date of its organization the Power group was immediately popular, as evidenced by the large attendance at the two meetings held, and it is hoped that the present program will result in increased participation by the younger men in the Metropolitan district.

New Officers for National Electrical Manufacturers Assn.

NEW officers were elected, a new managing director appointed and six trade practice conferences—the first in the electrical industry—were held under the auspices of the Federal Trade Commission during the third annual meeting of the National Electrical Manufacturers Association at the Wardman Park Hotel, Washington, D. C., the week of October 7.

Clarence L. Collens, president of the Reliance Electric & Engineering Company of Cleveland, was elected to succeed Huntington B. Crouse as president of the Association.

A. W. Berresford, president of the American Engineering Council, past president of the Associated Manufacturers of Electrical Supplies, Electrical Manufacturers Club and the American Institute of Electrical Engineers, was appointed Managing Director of N.E.M.A., effective at once, to succeed Alfred E. Waller, resigned. Mr. Berresford was formerly vice-president and general manager of the Cutler-Hammer Mfg. Co. and vice-president of what is now the Kelvinator Corporation.

After accepting Mr. Waller's resignation, resolutions of appreciation for what he had accomplished with N. E. M. A. were adopted and ordered spread on the minutes.

A. E. R. A. Convention

AWARD of the Charles A. Coffin electric railway medal to the Chicago, South Shore & South Bend Railroad was announced at the annual convention of the American Electric Railway Association, held at Atlantic City, N. J., Oct. 1-4. In marked contrast with many other once prosperous electric railways, hard hit by the ever-increasing use of buses and private automobiles, the South Shore line, after adopting the most modern equipment, showed in 1928 an increase in passengers carried of 8½ per cent over 1927 and 24 per cent over 1924.

Charles Gordon, the new managing director of the association, dwelt on the necessity of protecting both investors in electric railway securities and the communities served by them through putting the companies on a sound financial basis.

The usual great attendance characterized the meeting, of which one feature was international talking motion pictures. Those presented were: Secretary of Commerce Lamont, Lord Ashfield, head of the London Underground Railways; Ernest Reuter, head of the Berlin Street Railways, and Andrew W. Robertson, chairman of the board of the Westinghouse Electric & Manufacturing Company.

Paul Shoup, executive vice-president Southern Pacific Company, San Francisco, was elected president. The 1930 meeting will be held in that city.

New Standard Announced for Flexible Cord

ANNOUNCEMENT has been made by the Flexible Cord Group of the National Electrical Manufacturers Association of a new standard which will greatly increase the mechanical strength and improve the serviceability of flexible cord.

The new specification—which becomes effective Jan. 1, 1930, and after which no cord not fully complying with it will be labeled by the Underwriters' Laboratories—reads as follows:

"All dry braids, both individual and overall, shall be braided of cotton, rayon or silk in such a manner as to result in all adjacent individual parallel threads *actually touching each other,* and shall show no visible open spaces, when observed through a standard braid counter." It is also stated that cords complying with the National Electrical Code can be identified by the following points:

1. The parallel threads of all braids must touch when viewed under an ordinary single lens pocket magnifying glass.
2. The rubber covering must be tough and stretchy, similar to that on a good grade of code wire, and of the required thickness.
3. The copper conductors must either be tinned or protected by a fibrous covering to prevent corrosion.
4. The minimum copper size for a standard cord is No. 18 AWG, usually made up of sixteen strands of No. 30 AWG.
5. All Underwriters' Laboratories standard cords contain manufacturers' identifying marker threads as required by code and as given in Underwriters' List of Inspected Electric Appliances.
6. Underwriters' labels further identify Underwriters' Laboratories standard cords.

National Safety Council Congress

FOUR papers, making up a symposium on "Protection of the Public," were perhaps the high spot reached in the program of the Public Utilities Section of the National Safety Council's annual congress, held at Chicago, Oct. 1-4. The viewpoints were respectively those of telephone and telegraph, transportation, gas and electric utilities. The light and power paper, by W. Briley Wright, of the Eastern Shore Public Service Company, Salisbury, Md., contained a thought that sometimes appears to be lost sight of by utility men working in the streets. This is that utilities use public property by sufferance only, whereas citizens use public property as a common-law right; therefore the burden of caution is definitely on the utilities.

An excellent paper, well illustrated, with slides, on the safe handling of poles was presented by C. S. Holloway of the Illinois Bell Telephone Company. This paper was a virtual compendium of the subject.

Another outstanding contribution was from E. C. Stone, former chairman of the Engineering National Section, N.E.L.A. Mr. Stone contended that the safety standard set by industry is far higher than the safety standard which the people as a whole set for themselves and that industry has shown a consistent and marked improvement in its accident record over the period for which records are available.

WHAT OCCURRED LAST MONTH

Agricultural

More than 52,000 farms in New York State will be using electric central station service and approximately 14,500 miles of rural distribution lines will have been built by electric utility companies before the end of the present year, according to a survey by the New York State Committee on Public Utility Information.

* * *

Canadian Output of Electricity

A report issued by the Dominion Bureau of Statistics shows that during August the output of electric power companies in Canada totaled 1,444,314,000 kw-hr., against 1,410,709,000 in July, and 1,313,556,000 in August, 1928. For the first eight months of 1929 the output was 11,422,244,000 kw-hr., against 10,308,118,000 in 1928.

* * *

Colorado River Project

At a conference in Washington, October 14, a tentative plan for operation of the facilities of Boulder Dam by the United States Government and prospective lessees was submitted to representatives of the lessees. Secretary of the Interior Wilbur, in explaining the plan, said that there was nothing final about it, but that it would serve as a starting point. The plan calls for building of the dam, outlet works, power tunnels and power plant by the government, while the lessees install the machinery and equipment in the power plant and provide the necessary switching, transforming and transmission facilities. The tentative plan fixed the rate for current at 1.63 mills per kw-hr., with provision for readjustment at the end of fifteen years from the date of execution of the contract.

* * *

On October 21, Secretary of the Interior Wilbur announced definite decision regarding the allocation of power to be generated at Boulder Dam, and prospective lessees have been advised that any objections will be formally considered at a hearing on Nov. 12. Subject to certain deductions which may arise through the exercise of preference-rights, the power will be divided as follows: To the Metropolitan Water District of Southern California, 50 per cent, or so much thereof as may be needed and used for the pumping of Colorado River water; to the city of Los Angeles, 25 per cent; to the Southern California Edison Company and associated companies, 25 per cent. The deductions which may arise through the exercise of preference-rights would be caused by the States of Nevada and Arizona claiming allotments which are provided for them. Should the 50 per cent allocated to the Metropolitan Water District be not required for pumping, 66 2/3 per cent of this will be available to the city of Los Angeles and 33 1/3 per cent to the Southern California Edison and associated companies. There are provisions for municipalities which may desire power. A Board of Control is to be set up by the agencies receiving the power.

* * *

Consolidations

It was announced on October 1st that the Standard Oil Company of California had acquired from A. E. Fitkin & Company the Pacific Public Service Corporation. The company serves gas and electricity to a large territory just south of San Francisco and has water and ice services in Los Angeles, San Diego and other communities.

* * *

The Cambridge, Mass., Gas Light Company has asked the State Department of Public Utilities to approve its plan to take over the Cambridge Electric Light Company.

* * *

The American Commonwealths Power Corporation has announced the acquisition of the Interstate Fuel and Light Company which controls the Michigan Fuel and Light Company, distributor of manufactured gas to fourteen communities in Michigan and Wisconsin.

* * *

The New Bedford, Mass., Gas and Edison Light Company has announced the sale of the majority of its capital stock to the New England Gas & Electric Association, part of the Associated Gas & Electric System.

* * *

Dispatches from Montreal tell of an offer being made by the Canada Power and Paper Company to stockholders of the Wayagamack Pulp and Paper Company and the Port Pulp and Paper Corporation for an exchange of stock which would result in absorption of those two companies by the Canada Power and Paper Corporation. The total assets of the merged companies would be about $178,000,000.

* * *

The Southern Public Utilities Company, subsidiary of the Duke Power Company, has purchased the holdings of the Brevard Light and Power Company and the distribution lines of the Cascade Power Company.

Reports from Memphis are to the effect that the Alabama and Tennessee electric power and light properties of the Southern Cities Utilities Company will be acquired by the Commonwealth and Southern Corporation, or its subsidiary, the Southeastern Power and Light Company.

* * *

Announcement of the purchase by the Central Public Service Corporation of three utility properties held by the Dawes interests is said to mark the withdrawal of those interests from public utility fields. The Seattle Lighting Company, The Central Indiana Gas Company and the New York and Richmond Gas Company are the properties purchased.

* * *

On October 15, the American Commonwealths Power Corporation announced plans for acquisition of the following public utility companies: The Ramapo Gas Corporation, operating in Rockland County, New York; the Interstate Fuel and Light Company, serving a group of cities in Indiana and Michigan; the Vermont Lighting Corporation, supplying gas to several Vermont cities; the St. Johnsbury, Vt., Gas Company; the Ware, Mass., Gas Company, and the North Attleboro, Mass., Gas Light Company.

* * *

A petition filed with the New Hampshire Public Service Commission asks for approval of the purchase by the Central Vermont Public Service Corporation of assets of the Vermont Hydro-Electric Corporation, the Bradford, Vt., Electric Light Company, and the Windsor, Vt., Electric Light Company.

* * *

The Pacific Gas and Electric Company has asked the California Railroad Commission for permission to acquire 4580 out of 10,000 shares of the common stock of the Vallejo Electric Light and Power Company.

* * *

On October 22, the Middle West Utilities Company announced consummation of plans for acquisition of the properties of the United Public Service Company. The Middle West will acquire the common stock of the United company. United Public Service Company's properties supply service to 240 communities in Kentucky, Ohio, Indiana, North Dakota, South Dakota, Arkansas, Texas, Louisiana, Mississippi, Tennessee and Alabama.

* * *

Earnings of Public Utilities

The Department of Commerce announces that gross earnings of public utility enterprises in August, exclusive of telephone and telegraph companies, as reported by 95 companies or systems operating gas, electric light, heat, power, traction and water services, were $179,500,000, as compared with $178,000,000 in July, 1929, and $173,952,469 in August, 1928. Gross earnings for the first eight months of 1929 were $651,000,000, as compared with $554,432,512 for the corresponding period of 1928.

* * *

Federal Trade Commission's Investigation

On October 3, at a hearing held by the Federal Trade Commission in Washington, several witnesses were questioned concerning an alleged memorandum circulated in August by Laurence Todd, a Washington correspondent, and claimed by Mr. Todd to have been written by some one connected with the utilities. The document dealt with accounting practices of the Federal Power Commission. Witnesses questioned by Colonel William T. Chantland, Assistant Chief Counsel of the Trade Commission, were Paul S. Clapp, managing director of the N.E.L.A., Paul A. Schoellkopf, president of the Niagara Falls Power Company, and M. O. Leighton, of Washington, D. C. These witnesses declared that they knew nothing of the memorandum. Mr. Clapp testified that he had made an investigation but had not been able to discover the author of the document. Mr. Todd, Washington correspondent of the Telegraph Agency of the Soviet Union, who circulated the memorandum, was not examined.

Colonel Chantland conducted the examinations because of the illness of Judge Robert E. Healy. At the conclusion of the hearing, Chairman McCulloch announced that further hearings would be postponed for several weeks due to Judge Healy's illness. He also said that examination of witnesses by representatives of the utilities is likely to be the first order of business when hearings are resumed.

* * *

The seventeenth monthly interim report to the Senate on the Federal Trade Commission's utilities inquiry was made public October 16. In this the Commission says that delay of some large holding company groups in returning questionnaires and submitting records relating to mergers and other financial transactions is slowing up financial phases of the investigation. Offices of twelve electric and gas companies in various parts of the country have been visited in the last three months by the Commission's examiners seeking to develop facts with respect to the growth of capital assets and capital liabilities and the costs of the charges of service companies, the report declares. It says that the Commission needs additional accountants if the investigation is to be carried on expeditiously.

* * *

Foreign

A London dispatch says that the Southern Railway Company announces its decision to begin electrification of its main line from London to Brighton, a distance of 51 miles. Branches constituting an additional eleven miles will also be electrified.

* * *

Hydro-Electric

Fifty potential dam sites for the development of hydro-electric power have been located in the Potomac River Basin above tidewater as the result of the season's work conducted by field parties under the direction of Major Somervell, District Engineer for the War Department in the Washington area.

* * *

The Bureau of Reclamation announces that the rural electrification program of the Salt River, Arizona, reclamation project is practically complete. Electricity is now available at every one of the 7000 farms on the project.

* * *

Twenty applications for permits, or licenses, under the Federal Power Act, were filed with the Federal Power Commission during the quarter from June 30 to September 30. These involved approximately 127,120 primary horsepower.

* * *

The three Cabinet members of the Federal Power Commission—Secretary of War Good, Secretary of the Interior Wilbur and Secretary of Agriculture Hyde—have made an inspection trip of Cumberland Falls and the surrounding district as part of their consideration of the application of the Cumberland Hydro-Electric Power Company for permission to erect a power plant at the Falls. Secretary Good, in an interview on October 14, said that the Federal Power Commission was trying to determine the legal status of the Cumberland Falls question. So far, he said, it would appear that the Commission is practically compelled to grant the requested permit. The Commission found that in the territory around the Falls nearly everyone was in favor of the hydro-electric development. He also said that the Governor of Kentucky is in favor of it, but that a certain percentage of people in other parts of the State want the Falls preserved in their natural condition.

* * *

Secretary Wilbur on October 12 declared that regulation of all inland water affecting the national life should be centered in a government agency, as the effects of water-storage on flood control, reclamation, irrigation and consumption by communities cannot be adequately considered by a competent regulating agency under present statutes. Although he does not approve the present structure of the Power Commission, Mr. Wilbur is not ready to advance a substitute plan.

* * *

It was announced on October 16 that directors of the Pennsylvania Water and Power Company are to take action leading to construction of a $30,000,000 hydro-electric development at Safe Harbor, Pa., on the Susquehanna River. The development will be carried out by a separate corporation to be known as the Safe Harbor Water Power Corporation, but this will be directed by the same management as the Pennsylvania Water and Power Company. The initial development at Safe Harbor will have a total capacity of about 230,000 hp., and an ultimate capacity of over 500,000 is planned.

* * *

On October 16, the Federal Power Commission granted to the Gasconade River Power Company of Kansas City, Mo., a preliminary permit for two years on a proposal to install a plant of 12,000 hp. on the Gasconade River; to J. N. McDonald, Sarasota, Fla., a preliminary permit for two years for a 16,000 hp. project on the Oklawaha River; to the Inland Power and Light Company of Portland, Ore., a license for a plant on the Lewis River, with initial installation of 54,000 hp. and ultimate installation of 216,000 hp.; to the Washington Electric Company of Seattle a license to install a plant on the Columbia River, near Wenatchee, pursuant to a preliminary permit issued Sept. 3, with initial installation of 84,000 hp. and ultimate installation of 210,000 hp. The licenses call for protection of navigation, irrigation and fisheries. The Commission also granted a license to the city of Hyrum, Utah, for a 600 hp. project on Blacksmith Fork.

* * *

A dispatch from Toronto says that the Ontario Hydro-Electric Power Commission has secured power rights at Chats Falls.

* * *

Attorney-General Ward of New York State, in an address on October 18 to the New York State Waterways Association, declared that he was not in accord with the Conservation Department of the State in its policy of laying large taxation on water users for the benefit of the State as a whole. It is his position that the opportunity to develop cheap power is a local or geographical advantage and that it is unfair to spread the benefits of the situation through heavy State taxation.

* * *

Land has been acquired by the Virginia Public Service Corporation for the construction at Greaver's Mill on the Jackson River in western Virginia of a new hydro-electric unit costing $2,000,000 and capable of developing 100,000 hp.

* * *

Paper Company Sells Newspaper Interests

Dispatches from Boston say that the International Paper Company is now virtually out of the newspaper field, its only remaining interest being in the Augusta, (Ga.) *Chronicle* and three associated newspapers.

* * *

Municipal Plants

Portland, Ore., has appropriated $25,000 to finance a study of municipally-owned electric utilities.

* * *

Although a majority of the voters of Bayport, Minn., on Sept. 30 voted to sell the town's electric distribution system, the project was defeated because the required two-thirds favorable vote was not cast.

* * *

Municipal Ownership

The change from private to municipal ownership and from municipal to private ownership of public utilities is discussed in "The Changing Character and Extent of Municipal Ownership in the Electric Light and Power Industry," a monograph by Herbert B. Dorau, just published under the auspices of the Institute for Research in Land Economics and Public Utilities. Copies may be secured by addressing Dr. Richard T. Ely, editor of the *Institute,* Chicago. The price is $1.50 per copy.

* * *

Muscle Shoals

In response to a letter written by Senator Heflin urging that Henry Ford again interest himself in Muscle Shoals, Mr. Ford's secretary has written to the Senator saying that he has been advised to say that Mr. Ford has no plans at this time whereby the power at Muscle Shoals could be utilized and that it would be outside the question for Mr. Ford to make an offer again. The letter further says that Mr. Ford has suggested that other interests are in a better position to develop and utilize the power.

* * *

On October 4, Senator Black of Alabama, addressing the Senate, declared that between now and January something ought to be done with respect to Muscle Shoals in order "to relieve the Southern farmers from servitude to the foreign control of nitrate production."

* * *

An article by Senator Capper in the New York *Herald Tribune* and the *Washington Star,* October 6, advocates use of Muscle Shoals for fertilizer production and declares that the prospect of too much electric power, rather than any lack of power, is considered by power companies of the Southern Appalachian region.

* * *

New York State Inquiry

The Special Investigating Commission, appointed by the Governor and Legislature of New York, composed of six Republican legislators and three appointees of Governor Roosevelt, with Col. William J. Donovan as counsel, began its hearings in New York City on October 9. William A. Prendergast, chairman of the Public Service Commission of New York State, was the first witness. He gave an account of the workings of the Public Service Commission, mentioning that the Commission disposes of 949 formal cases and 11,632 informal cases yearly on the average. He outlined suggestions for enlarging the powers of the Commission to include greater regulation of motor bus operation and aircraft service. He stated that the Commission is handicapped by a lack of personnel and facilities. Professor Bonbright, a member of the Investigating Commission, offered a resolution calling on members of the Commission to file with the secretary all connections, direct or indirect, which each may now have or formerly had with utilities.

* * *

The Special Investigating Commission continued its hearings on October 10, 11 and 16. William A. Prendergast, chairman of the Public Service Commission of New York State, continuing his testimony, suggested that the Public Service Commission should be given more jurisdiction over the submetering situation in New York State, told of the Public Service Commission's jurisdiction over certain railway matters and the growing demands upon its time and resources made by the increase in motor buses. He spoke of the difficulty in getting large appropriations from the Legislature for the increasing work of the Commission. He also testified that in the past certain electric companies of New York State showed a rate of return as high as 11 and 13 per cent on the basis of their book values, but declared that most of these have since made reductions. He also stated that among the 8558 orders issued by the Public Service Commission, only 46 had been taken to court and only 10 had been reversed. In his testimony on the 16th, Mr. Prendergast advocated that the Public Service Commission be given complete authority over holding companies which control any utility corporation over which the Commission has authority.

* * *

Production of Electricity

The Geological Survey of the Department of the Interior announces that a new record in the production of electricity by public utility power plants was set during the month of August. The total of kilowatt-hours produced was 8,259,000,000. The greatest figure hitherto, in January, 1929, was 8,241-000,000.

* * *

Railway Electrification

An announcement made by officials of the Pennsylvania Railway on October 22 says that complete electrification of the Pennsylvania from New York to Washington, including the Baltimore tunnels, is now in sight as the result of an agreement reached between the company and the city of Baltimore.

* * *

Rates

The Arkansas Power and Light Company announced on Sept. 25 that more than $600,000 per year will be saved by 60,000 domestic and commercial customers of the company in 170 communities under new rates approved by the Board of Directors. The new schedule will become effective Jan. 1.

* * *

A new schedule of rates offered by the Utica, N. Y., Gas and Electric Company has been accepted by the Common Council and approved by the Mayor. It is estimated that the new rates will save about $220,000 annually to consumers.

* * *

The Houston, Tex., City Council has passed an ordinance embodying a new schedule of electric rates offered by the Houston Lighting and Power Company, which, it is expected, will result in an annual saving to consumers of $250,000. A profit-sharing agreement now in effect between the city and the company continues in force.

* * *

The Fairbury, Neb., City Council has announced a reduced rate for towns of Reynolds and Gilead.

* * *

The Monongahela West Penn Public Service Company, having acquired the electric property of the Richwood, W. Va., Light and Water Company, announces that rates for the district served by the acquired company will be reduced to conform with its general rates for domestic and commercial consumers.

The Northern States Power Company announced on Oct. 9 that it had arranged for a further reduction of rates, amounting to approximately $1,250,000 annually to consumers in the Central Northwest territory served by the company. The reductions will apply to 400 cities, towns and villages. In most of these, all classes of customers will benefit. In Minneapolis and St. Paul, which received a large reduction in 1928, residential rates will not be reduced, but rates for commercial lighting and small power will be cut substantially.

* * *

The Consolidated Gas and Electric Company of Baltimore has accepted a ruling by the Public Service Commission of Maryland which means a reduction of about $1,300,000 per annum for electricity and gas in the territories served.

* * *

A voluntary electric rate reduction schedule filed by the Kansas City Power and Light Company, affecting Kansas City and 37 towns, will mean a saving to electric customers estimated at $400,000 a year. The schedule has been approved by the Missouri Public Service Commission.

* * *

The Commission of Public Works of Hudson, Mass., announces a reduction of about 15 per cent in electric lighting rates for the towns of Hudson and Stow. The initial rate in Hudson will be 7½ cents and in Stow 8½. The secondary rate will be 3½.

* * *

The Portland, Ore., Electric Power Company on Oct. 12 announced a reduction of 20 per cent in all industrial power schedules. This means a cash saving to customers of about $500,000 a year. The new rates go into effect Dec. 1.

* * *

The North Adams, Mass., Gas Light Company, which supplies gas and electricity for Adams, North Adams and Williamstown, announces a reduction in its electric schedules which will save consumers $20,000 a year. The Cape and Vineyard Electrical Company announces lower rates for the towns of Bourne and Sandwich, Mass. New and lower rates for Lowell, Mass., were announced Oct. 17.

* * *

A reduction of about $30,000 a year in rates for Fort Dodge, Iowa, served by the Fort Dodge Gas and Electric Company, is announced.

* * *

The Keystone Public Service Company of Oil City, Pa., has announced reductions in residential rates in Oil City, Franklin, Titusville and surrounding territory. The annual saving to consumers will be $41,000.

* * *

Regulation

Senator Couzens, who is chairman of the subcommittee investigating interstate communications and power, has announced that legal phases of the investigation will be handled by William C. Green of St. Paul, former Assistant Federal Attorney at Fargo, N. D.

* * *

On Oct. 11, the Department of Public Utilities of Massachusetts handed down a decision denying the request of The Edison Electric Illuminating Company of Boston to split its stock, 4 for 1, changing the par value from $100 to $25.

* * *

The special commission, created by the recent session of the Massachusetts Legislature to study the power situation in the state, announces that questionnaires are being sent to 111 gas or electric operating companies and 203 investment trusts.

* * *

Opposition to the Couzens bill which would create a federal commission on communications and power is set forth by the State Corporation Commission of New Mexico in a protest just sent to the members of the New Mexico delegation in Congress. The protest calls the bill an attack on state rights.

* * *

St. Lawrence Project

"New England and the St. Lawrence Seaway" is the title of a book by Henry I. Harriman, president of the Boston Chamber of Commerce, which has recently been published. This is a strong argument in favor of the St. Lawrence project from the point of view of New England.

* * *

On Oct. 2, 3 and 4, hearings were held in Washington by Special Master Charles Evans Hughes in the case of the states of Wisconsin, Michigan, Minnesota, New York, Ohio and Pennsylvania, against the Sanitary District of Chicago, in the matter of diversion of water from Lake Michigan by the Sanitary District.

* * *

In an address at Louisville, Ky., Oct. 23, President Hoover reiterated his support of the St. Lawrence project, saying that this country should undertake to do its part whenever Canada has overcome its difficulties. He said that, after disposing of the electrical power, the entire waterway construction could be contracted for less than $200,000,000.

* * *

A dispatch from Montreal tells of commencement of the work for development of the St. Lawrence River by the Beauharnois Light, Heat & Power Company. The project calls for developing 2,000,000 horsepower and provides 30-ft. depth navigation between Lake St. Francis and Lake St. Louis.

* * *

Subway Contract Awarded

On Sept. 27, the City of New York awarded to The New York Edison Company the contract for supplying current for the new city-owned subways. The price is to be 7.99 mills per kw-hr.

* * *

Water Power

A recommendation that water power problems in New York State be removed from politics and placed in the hands of representatives of unbiased business interests, was made Tuesday Oct. 22, in a report of the committee of twenty-five, which was appointed last April by the New York State-wide Economic Conference, with the object of stemming the migration of industries from the State.

Great Lakes Division Commercial Conference Jan. 20-22

ON Jan. 20-22, at the Edgewater Beach Hotel, Chicago, the Great Lakes Division will hold a Commercial Conference. On Monday there will be a meeting of the Power Club and on Tuesday and Wednesday there will be a Merchandising Conference. On the same days an Electrical Advertising School will be held.

Details of the Programs will be published in a later issue of the BULLETIN.

Correction

MR. FRANK A. WARDLAW, Secretary of the Edison Pioneers, has called the attention of the Editor to a mistake in the caption of the illustration on page 632 of the October number of the BULLETIN. It gives the impression that the original Edison incandescent lamp was first demonstrated to the public on October 21st, 1879. As a matter of fact, the first public demonstration did not occur until December of that year. The lamp pictured was the one used in the demonstration on December, 1879, and not on October 21st, 1879, as the caption indicates. On October 21st, Mr. Edison turned on the current into the first practical incandescent lamp. It burned steadily for forty hours. He announced his invention and demonstrated it to the public December 21st, 1879.

LEGAL DECISIONS from RATE RESEARCH

EDITOR'S NOTE: *Rate Research*, which is published weekly by the Rate Research Committee of the National Electric Light Association, sets forth those decisions of various courts and Public Service Commissions which are of immediate interest to the light and power industry. It does not attempt to publish all such decisions. Decisions not directly connected with the industry are often published if, in the opinion of the editors, the principles involved are of importance.

It is believed that the publication, from month to month, of comments upon some of the leading cases, free from legal phraseology, will be useful. Public utility law is comparatively new, and everyone connected with public service enterprises should have an understanding of the trend and significance of these commission and court decisions.

For these reasons the N. E. L. A. BULLETIN will carry each month brief comments on some of the leading cases reported by *Rate Research* as coming before either State or Federal courts or Public Service Commissions.

Principles Involved in Suits for Negligence

THE law recognizes electricity of high voltage as an element of very great potential danger to life and property and imposes upon persons engaged in its generation and transmission the duty to use a degree of care, diligence and foresight in proportion to the danger involved. The United States Circuit Court of Appeals, Fourth Circuit (Dunagan v. Appalachian Power Company, 35 *Rate Research* 261), has just approved the above statement of law and also approved a statement that the duty referred to requires:

(1) The installation and use of such devices and safeguards as are in established and practical use in the business for the protection of life and property.

(2) The exercise of reasonable care commensurate with the danger in maintaining such devices.

(3) Thorough inspection of the devices and equipment at such times as reasonable care in view of the danger may require.

(4) That the employees in charge of the operation of the devices and equipment are to use reasonable care in the discovery of dangerous conditions and immediately use reasonable caution to prevent injury.

If, however, the power company's lines are properly constructed of proper materials, properly inspected in accordance with the practice in such cases usually followed by those engaged in the business; if the power house is properly equipped with the usual modern appliances known in practical use, and if the power company within a reasonable time after such appliances indicate trouble, take reasonably prudent steps to remedy the same, the power company cannot be held liable for injury.

The Constitutional Debt Limit of Municipalities

THE question of when a municipality has incurred indebtedness within the constitutional provision limiting the amount of indebtedness which a municipality may incur, has arisen in several western and southern States in the last few years. To the ordinary layman, at least, these decisions do not seem to be entirely consistent, and it may be said that there is a conflict on the subject. Of late, the question has arisen in connection with the building of a municipal light and power plant where the city has contracted that the amount to be paid therefor shall be paid out of a special fund created by the city from the product or service of the plant. The Utah Supreme Court (Barnes v. Lehi City, 35 *Rate Research* 266) has just held that such contract has not created an indebtedness within the meaning of the Utah constitution. In this respect it follows the Supreme Court of the State of Washington and also of the State of Colorado. The case gives a fairly good reference to decisions by other courts. In this case, as in several others, Fairbanks, Morse & Company had made the installation. The extent to which Fairbanks, Morse & Company have proceeded along these lines in other States, can be gathered from the decision in the case of Fairbanks, Morse & Company v. Texas Power & Light Company, decided by the United States Circuit Court of Appeals, Fifth Circuit (35 *Rate Research* 215).

Charge for Connection and Disconnection for the Short Term Users

THE New Jersey Board of Public Utility Commissioners has upheld a rule providing that when the current is supplied for a period of six months or less there shall be a charge of $3 when the connection or disconnections of wires or meters is necessary. The Commission finds that the costs of supplying service readily fall into three general classes, two of which are fixed and one variable. These are: (1) customer charges varying roughly with the number of consumers; (2) the element of cost of service depending upon the proportion of plant and distribution system which the company must maintain or hold in reserve for each customer; (3) the element of cost depends upon and varies with the actual amount of electricity consumed.

The Commission then finds that all year round customers generally bear their due costs for all three classes, but seasonal customers frequently do not do so and entail larger costs, for instance, in more frequent connection and disconnection. They held it reasonable that the electric utility should segregate these short term customers and impose a proper charge for connection and disconnection (35 *Rate Research* 227).

It Does Not Pay to Steal Electricity in New Hampshire

A MAN named Rousten was in the bakery business at Manchester. He was charged under a statute of New Hampshire, which makes it a punishable offense for any person wantonly and maliciously to prevent an electric meter from duly registering the amount of electricity supplied, or causing it to be done. In this case a short wire called a "jumper" had been attached to the outside wires of the meter, thus diverting the current. The conviction was sustained by the Supreme Court of New Hampshire, State v. Rousten (35 *Rate Research* 217).

The Boston Edison Case

IT is not often that any commission hands down a decision which has received such a general discussion as that of Massachusetts Department of Public Utilities in the matter of the application of the Boston Electric Illuminating Company to change the par value of its $100 stock into $25 stock, a privilege which has been granted forty-five other companies in Massachusetts (35 *Rate Research* 299).

In rendering the decision, the Commission took occasion to criticize the price being paid for the stock of the company on the Boston Stock Exchange where it has been listed for a great many years.

The decision involves a great many interesting points, and not the least interesting of them is the question of how far commission jurisdiction can or should go; whether the peculiar system of regulating public utilities in Massachusetts is preferable to that which exists in all other States.

For those interested in the discussion of some of these subjects, reference is made to the current *Public Utilities Fortnightly*.

A UNIQUE RATE SCHEDULE

According to *The Round Table* the following rate schedule appears upon the bills of a municipally owned plant in Tennessee:

RULES: Lights on the sliding scale. Places of business, $2.00 the month, with 12 watts to go, 8 watts at 12½c. and 30 watts at 10c., above 50 watts at 8c. Net due on the first of each month, and a 25c. penalty for failure to pay ere the 10th. Residences, minimum $1.50 with 12 watts to go, and otherwise same as above.

Picked up from

ELECTRICAL NEWS ITEMS

Issued weekly by Department of Public Information, National Electric Light Association, 420 Lexington Avenue, New York City. All or part may be used without further notice and with or without credit being given

Cooking Food by Electrocution

ELECTROCUTING steaks, chops, roasts, potatoes, and, perhaps, eventually the lowly "hot dog," instead of using ovens or broilers for cooking, is the latest idea to be sprung on the tired business man by the home economics experts whose job it is to show the housewife how to beat the "dinner in town with a friend" or the night club game with home cooked dinners.

The new scheme of cooking is a product of the Iowa State College household equipment staff, and is an invention of Miss Lenore Sater. The device, in its present stage, consists of an ordinary glass jar with a steel plate in the bottom forming one electrode. The other electrode is a steel plated plunger which is placed in the jar—and there you are. Place in the jar meat, vegetables or whatever you want to cook, throw the switch and, as is said in the best of home economic circles, "that's that."

According to Miss Sater, the idea originated in Germany by placing two electrodes in a potato and passing an electric current through it.

"Black Streets Are Back Streets"

THE Newspaper Advertising Copy Service, issued each month by the National Electric Light Association for the benefit of member companies, contains, for November, an advertisement calling attention to the benefits of a well-lighted store and a well-lighted, well-dressed shop window. Now comes Dr. Julius Klein, formerly Director of the Bureau of Foreign and Domestic Commerce and now Assistant Secretary of Commerce, emphasizing the importance of effective lighting as an aid to merchants, in a speech before the Broadway Association, New York. "In the present era of well-lighted shops," he says, "dinginess may be disastrous. At least, it is suspect. Gloom in a store often hides more than the stock. It may cloak bad features in arrangement and in sanitation."

Dr. Klein cited two experiments made by the Pacific Coast Electrical Association. In two poorly lighted establishments, one a jewelry store and the other a confectionery and lunch room, modern lighting equipment was installed. A close check on advertising value and actual business done was made before and after the change.

"Under the old lighting, less than 17 per cent of the passers-by stopped to look into the jewelry store window, but with the good modern lighting the percentage jumped to 70. For the lunchroom, the increase in the advertising value of the brighter windows was from 21 to 52 per cent, by actual count." The jeweler is now spending only $30 more a month for electricity, is getting four times as much advertising value from his windows, and his actual business has increased 27 per cent.

In the West originated the slogan, "Black streets are back streets." The converse is illustrated by Broadway, with its miles of light and its sunburst center at Times Square.

Loss of Electricity Between Power House and Customers' Meters

THE significance of the fact that at least 15 per cent of all of the power generated by central stations throughout the United States is "lost" somewhere between the power house and the customers' meters is little understood. According to the Bureau of the Census, there was available for distribution in the United States during the year 1927 more than 104 billion kilowatt hours, yet according to the figures of the Statistical Research Department of the National Electric Light Association, only a little more than 89 billion reached the ultimate consumers.

This loss in energy during transmission is something which is inherent in the generation and distribution of electricity, and as yet electrical engineers have apparently been unable to overcome it. It means, however, that every central station must be equipped to generate more actual kilowatt hours than it can possibly deliver to its customers and that out of every 100 kw-hr. it generates, an average of at least 15 will disappear, just as in a carload of fruit or vegetables there will be a certain percentage of spoilage in transit.

Or, putting it another way and taking the average for the whole United States, every time a consumer buys 100 kw-hr. there must be generated at the power station 117½ kw-hr. His position is exactly the same as when he goes to the meat market for a five-pound roast. If he buys a five-pound roast he doesn't get five pounds of meat, or, if he wants five pounds of meat, his roast will weigh more than five pounds.

Looking at this situation from the standpoint of rates, if the consumer is paying, for example, 6 cents a kilowatt hour, his bill for 100 kw-hr. is $6. But the company has actually generated for him 117½ kw-hr.—for which it receives $6—and therefore instead of receiving 6 cents for a unit of its product, it actually receives only 5.1 cents.

The Stage Electrician to the Front

AT last the stage electrician has come into his own. No longer must he remain back-stage unseen by the audience, sans honor and sans song. With a new installation for the handling of lighting effects, the Chicago Civic Opera House has brought him out in front alongside the musical director.

In front of the curtain, the lighting operator will control the stage and house lighting as easily and as intelligently as the orchestra conductor now directs the orchestra. In front and on each side of him will be arranged dials, knobs, tumbler switches, indicating lights, etc. By the mere manipulation of a single knob all the complexities of stage lighting will be controlled, lights of various colors fading and brightening at various points and at the proper moments. Scenes requiring complex lighting effects, such as sunset, sudden thunderstorms, ballets, etc., will require no more effort in their control than is required to flick a lighting switch in the home or to turn a door knob.

Modern Equipment Replaces Antiquated Layouts

THE recent placing in operation of a 60,000-hp. hydro-electric plant at Bellows Falls, Vt., by the New England Power Association, furnishes an excellent example of the substitution of modern equipment for antiquated layouts handed down from the past.

Formerly 70 water wheels aggregating 10,000 hp. were at work within a stretch of one-third of a mile. Now three vertical generating units with a new dam and rebuilt canal and with six times the capacity, have taken their place. The development in general consists of a concrete dam with flood control equipment, canal, power house, tail race and outdoor switching stations.

THE REVIEWING STAND

Electrification of Steam Railroads

Report, Electrification of Steam Railroads Committee, N. E. L. A. Publication No. 289-118, 82pp. (illustrated). Price, $1.15; to members, 75 cents.

PROGRESS of railroad electrification in the United States and in foreign countries is covered in this report, the most important feature being the result of an extensive survey of electrified railroads in Europe and the British Isles made by a subcommittee sent abroad for that purpose late in 1928.

While railroad electrification began in this country as early as 1895, the United States had only 1753.32 route miles electrified at the close of 1928. Europe, on the other hand, had practically no electrified mileage prior to 1915 and now has 4996.33 route miles electrified. This is exclusive of Soviet Russia and the British Isles. Great Britain has 1019.12 route miles electrified, Canada 92.16 miles, while the whole of Central and South America combined has only 566.30 miles.

Within the past year three important electrifications have been completed in the United States. The Great Northern Railway finished the installation work in its new Cascade Tunnel and complete electric operation began on Jan. 12, 1929. The Pennsylvania Railroad completed the electrification of a number of additional suburban routes in its Philadelphia district. The Boston, Revere Beach & Lynn Railroad completed the electrification of its narrow gage system.

Two large systems—the Pennsylvania and the Reading—have announced the authorization of large extensions to their electrified lines. The Pennsylvania will electrify its lines from New York to Wilmington, and the Reading will electrify its suburban lines in the vicinity of Philadelphia, intimating probable extensions to New York, Bethlehem and Reading. The Lehigh Valley is reported to be making estimates on the cost of electrifying its main line between Mauch Chunk and Wilkes-Barre, Pa., involving 75 miles of double track. The Delaware, Lackawanna & Western has selected for its suburban electrification near New York 3000-volt direct current with overhead contact, and it is reported that the reason for this is its adaptability to main-line operation in the future.

The subcommittee on electrification in Europe visited England, Netherlands, Sweden, Germany, Switzerland, Italy and France. In addition to visiting most of the steam railroad electrifications in these countries, the rapid transit subways were inspected in London, Berlin and Paris. After describing in detail the railroad electrification in these countries, its report, which is appended to the report of the general committee, presents the following conclusions:

"Electrification has so far been undertaken in definite localities for certain special reasons; electrification will be extended where it now exists and introduced into new districts, for the same compelling reasons; most of the electrification in Europe has come into existence since the war; the establishment of large commercial power systems (both private and State owned) in Europe has also been a post-war development, followed by interconnection of power systems so as to provide large pools of power; recognition of the technical advantages of securing power from the large commercial networks seems quite generally and constantly increasing in effect."

Appended to the general report is the report of a subcommittee "Standard Form of Contract." This committee has been making a study of the contracts used in this country for the sale of energy to electrified railroads and have outlined the desirable features to include in such a contract.—*E. G.*

Electric Rates and Their Status in 1929

Report, Rate Research Committee, N. E. L. A. Publication No. 05, 16pp. (illustrated). Price, 30 cents; to members, 20 cents.

THIS report of the Rate Research Committee deals with the status of electric rates and rate forms in 1929, reviewing historically the changes in forms over a period of years.

Striking evidence of the increasing use of the promotional rate forms for residence service is disclosed, 278 out of 392 large cities now having such rates available, as against 124 in 1922. Comment is given to the three cost components in residence service—demand, customer and energy costs, illustrating the relative minor part of the energy portion. The advantages of various rate forms are considered, but the experience of companies using promotional rate forms indicates that the particular form used for domestic service is not vital. The stimulation of business from reductions in follow-on rates is found to be much greater than from reductions in top rates. The report recommends that the top rates should not under normal conditions be reduced. It is predicted that in the near future rates of straight-line character will be obsolete.

In 127 cities of population of 20,000 or over, power factor adjustments are specified in power rates. In 55 cities the billing is adjusted either up or down, according to whether the power factor is below or above a certain specified percentage. Companies are urged to study the power factor problem with increasing attention. The matter of rural rates becomes relatively simple with a correct solution of the extension problem. The report recommends that rural customers be relieved of direct investment other than their own equipment, that rural rates be as simple as possible, that service or minimum charges be graduated, and that the energy charges be in quick-break block form and free of demand and customer costs to encourage maximum use.

Decisions of commissions and courts in public utility matters during the past year are summarized under headings of valuation, depreciation and reserves, going value, rate of return, rates and service, and taxes on electricity generated.—*C. E. N.*

Power House Cranes

Report, Hydraulic Power Committee, N. E. L. A. Publication No. 01, 12pp. (illustrated). Price, 25 cents; to members, 15 cents.

REQUIREMENTS and type of construction acceptable for cranes used in power houses and substations are outlined in this report, which is based on information on crane design obtained from member companies and crane manufacturers. Construction is recommended which is believed will be satisfactory under the services given and which should permit of the economics of construction with due regard to safety.

Turbines

Report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-98, 96pp. (illustrated). Price, $1.50; to members, $1.00.

THIS year's report presents a summary of the 1926 record of 153 turbines, 1927 record of 186 turbines, and the detail 1928 record up to 207 turbines. The 1928 record shows an increase in the per cent of total time during which the units were available for service. Compared with the 1925 record, the unit outage shows a reduction of approximately 25 per cent.

An investigation of the turbine operating methods disclosed that there is no consistency in the time in which cold machines of equal capacity are brought up to speed and loaded. Neither was there found any definite relation between major turbine troubles and the machine operating methods.

Troubles incident to turbine blading form the greatest single cause of turbine outage. Information is presented which should be helpful in suggesting a method of approach when these troubles are encountered.

The report reflects the tendency to increase the period between inspection, which has been annually for a majority of the operating companies.

Tests on turbo-generator units ranging in capacity from 6000 to 60,000 kw. are included. Statements by operating companies on new installations, special tests and unusual operating experiences are given, along with statements on turbine blading, large steam turbines and turbines used for auxiliary drive. A bibliography concludes the report.—*E. S. B.*

Power Station Chemistry—Part II

Report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-114, 44pp. (illustrated). Price, 75 cents; to members, 50 cents.

THIS report of the Chemists' Subcommittee includes a non-technical review of water treatment for steam generation. As a standard procedure the reporting of water analyses is in ionic form and expressed in parts per million by weight. The reactions involved in water treatment calculations are presented in ionic form, and a procedure is included for calculation of water reagent requirements.

A contributed statement discusses a graphic method of controlling the treatment in a Lime Soda system. An individual member statement on a laboratory study of turbine oil, using a Funk sludging machine, is given.

Approved test methods for judging the quality of turbine oils are presented under Recommended Test Procedures. The tests will serve to establish variations in various shipments of the same trade name of turbine oils, and a selected few will serve in a measure to show the rate of alteration an oil undergoes in service. The tests alone are not suitable for determining the comparative desirability of different brands of new oils for turbine lubricating service.

The report emphasizes the desirability of making tests for the Hydrogen Ion Concentration in water supplies as one of the factors to be considered in the corrosiveness of the water, and statements of the significance of the Hydrogen Ion Concentration have been included both as committee and manufacturers' statements.

Individual members have submitted statements for plant use, one on the graphical estimation of various alkalinities in water, the other, a plant control test for estimating phosphates in boiling water.

A manufacturer's statement on equipment for the electrometric determination of Hydrogen Ion Concentration and direct reading of the conductance of water concludes the report.—*E. S. B.*

Condensing Equipment

Report, Prime Movers Committee, Engineering National Section, N. E. L. A. Publication No. 289-111, 40pp. (illustrated). Price, 55 cents; to members, 35 cents.

THIS report includes a study of performance record of single-pass and two-pass condensers, excessive vibration and condenser leakage, and experience with condensers having tubes rolled into tube sheet at both ends.

Data indicate that the performance of single-pass condensers is somewhat better than that of two-pass. Performance of vertical condensers is appreciably better than horizontal condensers with the same number of passes. Tables included give design and performance data of 15 two-pass and 11 single-pass condensers. The variation of average heat transfer rates with inlet water temperatures is also shown. Excessive condenser leakage resulting from tube vibration has been experienced in some cases, which has been most effectively remedied by the installation of additional tube support sheets by the use of thicker tubes.

Two companies report satisfactory operation with condensers having the tubes rolled into the tube sheet at both ends.—*E. S. B.*

The Changing Character and Extent of Municipal Ownership in the Electric Light and Power Industry

By Herbert B. Dorau, Assistant Professor of Economics, Northwestern University School of Commerce. Published by the Institute for Research, Land Economics & Public Utilities, Chicago. 102 pages. Price, $1.50.

ACCORDING to the author in his preface, this is simply a preliminary report issued at this time in order "to make available, as quickly as possible, the results of an intensive search for facts about the changing extent and changing character of municipal ownership in the electric light and power industry of the United States." This being, as Professor Dorau says, only part of a larger study and interpretation of this most important subject, it is quite evident that he will eventually produce a document which will be of inestimable value not only to the light and power industry, but to every economist in the world.

In his very first sentence the author raises a question which has been puzzling large numbers of intelligent people. He says that in his study he has proceeded on the assumption that "municipal ownership in the electric light and power industry is an understandable and explainable phenomenon." No doubt it is. There probably has been a reason for the development of municipal plants in the past just as there must be a reason for the decline in municipal ownership during the past few years. The author sets out to define the various factors which explain this rise and decline, backing up his statements with an elaborate documentation in the form of statistical tables, charts and graphs, until one must become convinced that, insofar as the economic progress of these United States is concerned, the Marxian philosophy of government ownership and control of essential services is being more or less relegated to the role of a second-hand stage prop for the use of that noisy minority which refuses to have anything to do with the real work of the world.

Professor Dorau shows how municipal ownership has lost more ground during the past four years than it gained during the previous eight years. He explains the many factors which have brought, and will continue to bring, about these changes. He explains the origin of a majority of the municipal plants which have come and gone during the past fifty odd years by the simple fact that at the time no one else was willing to engage in the service. He shows that more than 54 per cent of these plants were started in communities of less than 1000 population and 85 per cent in communities of less than 2500 population. He brushes aside the attitude of certain groups of people toward government in business as relatively unimportant, presenting, with startling force, the political, legal, economic and technological factors involved in the operation of light and power plants and which leave local governments bogged down in the swamp of inefficiency.

It is a report which everyone who has the slightest interest in the light and power industry should read, word for word. If it is only preliminary, it is to be hoped that the author's final production will be ready for distribution in the near future and that the editor of the BULLETIN will receive an early copy.—*E. G.*

Edison: His Life and Inventions

By Frank Lewis Dyer and Thomas Commerford Martin with the collaboration of William Henry Meadowcroft. In two volumes, illustrated. Harper & Brothers, New York. Price, $10.00.

THIS is a simple, straightforward story of a simple, straightforward and very great American citizen which should be in every library, public or private, in the United States. Fortunately it contains little or no reference to the light and power industry and, therefore, it is safe for the official organ of the light and power industry to praise it. To mention it without praise would be to place the reviewer in the category of those who are actually illiterate and who make their living by writing comments on books based on the publisher's statements on the jacket.

The story of Edison is the greatest story which America has produced, not even excepting the stories of George Washington, Thomas Jefferson, Benjamin Franklin and Abraham Lincoln. It is so inspirational that educators might do well to include it in any plans for courses designed to mold the characters of the coming generation so that they may become useful citizens. Washington has been called the father of his country; Franklin, the first civilized American; Lincoln, the Emancipator; but to Edison has fallen the title of "The Greatest American Citizen."

To properly review this work, which happens to be the only authorized biography of Mr. Edison, would mean nothing more or less than to rewrite it. It is a very wonderful fairy story written by men who, following Mr. Edison for fifty or more years, have watched him make many fairy stories come true. In a sense it might almost be called an autobiography, because much of the account has been contributed or edited by Mr. Edison himself. In any event, the library which does not contain it can hardly claim the title "Library." It is just a place to store books.—*E. G.*

Public Service

A booklet. Contributors, William Butterworth, Roger W. Babson, M. S. Sloan, E. W. Herr, George B. Cortelyou, Thomas N. McCarter, Professor Irving Fisher. Edited by Irving Jay Rogers, 36 pages. Published by American Educational Press, New York. The publishers will supply these booklets at the following prices. In quantities to 2000, 16 cents per copy; 2500 or more, 14 cents per copy; 5000 or more, 12½ cents per copy; 10,000 or more, 9¾ cents per copy; 25,000 or more, 8¾ cents per copy.

THIS symposium by representative men of the country deals with the subject of government operation versus private operation of the public utilities, and is in effect an answer to the claims of public ownership proponents. While it may be claimed that Mr. Butterworth as president of the Chamber of Commerce of the United States, Mr. Babson as an economist, Mr. Herr as a manufacturer, and Messrs. Sloan, Cortelyou and McCarter as public utility operators are naturally biased in favor of private operation, the arguments they advance are incontrovertible. Although Professor Fisher asserts that private enterprises are subject to some of the temptations to mismanagement that are inherent in publicly operated enterprises, he writes that, ". . . few public businesses in America are now run, or can be run in the near future, by the public to better advantage than by private persons. The lower costs frequently cited to prove the benefits of, and necessity for, public operation are too often illusory—mere bookkeeping gains which disappear under any proper system of accounting."

This booklet deserves to be widely distributed.—*W. C.*

Women's Committee Meeting

(*Continued from page* 746)

and First Aid Teams which can appear before groups outside the industry demonstrating the Prone Pressure Method of Resuscitation and First Aid.

The women were urged by Miss Marguerite Butler to stimulate interest among all Women's Committee members in the National Public Speaking Contest arranged by the National Public Speaking Committee to be held during this association year.

Miss Sophia Malicki, member of the Industrial Relations Committee, called attention to the following reports of this committee and urged that they be read.

289-83 —Training for Better Public Contact—Building and Conducting the Training Program
289-44 —Training for Better Public Contact—Analysis of Public Contact Work
278-52 —Training for Better Public Contact—Its Necessity and Importance
289-56 —Health Promotion in the Public Utility Industry—Its Necessity and Importance

(*Continued top of next column*)

289-108—Training for Better Public Contact—Measurement of Results Obtained by a Public Contact Training Program

The subject of contact with outside groups was discussed by Miss Edna Decker, Miss Sue Carr and Mrs. Beulah Yewell. They told of the excellent work being done by Women's Committees within their territories with women's clubs, parent-teachers associations, schools, etc. Representatives of these groups are being invited into the educational meetings of Women's Committees, and members of Women's Commites are being asked by these organizations to appear before them with talks and demonstrations on subjects relating to the industry of interest to them.

The meeting was addressed by Mr. Paul S. Clapp, Managing Director, N. E. L. A., Mr. Harry Reid, Chairman, Public Relations National Section, and George F. Oxley, Director of Public Information, N. E. L. A.

MAGAZINE ARTICLES

BELOW is a list of articles which appeared in various magazines recently that are especially interesting to Women's Committee members:

Ladies' Home Journal—November
- The Household Buyer—Lita Bane
- Are We Safe at Home—Alice Ames Winter

Good Housekeeping—November
- Give the House a Christmas Gift
- Is Your Kitchen Convenient?—Helen W. Kendall and D. M. Taylor

Better Homes and Gardens—November
- In Our Testing-Tasting Kitchen—Josephine Wylie

Delineator—November
- For a Small Wash

Your Home—November
- The Sconce Comes Back Again—Marie L. Brown

Woman's Home Companion—November
- Reading Has Wings—Anna Steese Richardson

What Happened at Menlo Park, N. J.

(*Continued from page* 699)

F. D. Barstow, Kitt, Blan, Shaw and Wardlaw; J. U. Mackenzie's daughter, Mrs. Chaffee, Mrs. Barstow, Mrs. Charles T. Hughes, and hosts from the surrounding towns and villages.

The pictures describe the tower with its huge lamp better than words. It was 135 feet high—from the ground to the top of the lamp. This was illuminated at 8 p. m. from Dearborn by Mr. Edison, amidst resounding applause from those at Menlo.

Within the space of the actual laboratory site inclosing the steel tower and huge lamp, in the exact center of the old laboratory site, was a concrete pedestal on top of which was a plate-glass case in which was a replica of the original lamp, this being illuminated from below by specially arranged lamps so as to appear luminous. This was the "perpetual light" started with the lighting of the tower lamp, its source of light coming from both the Public Service current and storage batteries concealed within the concrete pedestal. On the bronze door of this pedestal was the stamped lettering "1879-1929" and the words:

"The light once lit shall never dim
But through all time shall honor him."
—R. R. Bowker.

The tower and lamp were underwritten by Mr. Barstow and erected by the Public Service, the large and "perpetual lamp" being supplied by the Edison Lamp Works. The large lamp on the tower was composed of some 960 lamps.

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(*Entire Dominion of Canada*)

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President, E. F. Kelly, Central Illinois Public Service Co., Springfield, Ill.; *Secretary-Treasurer*, George W. Schwaner, 205 Illinois Mine Workers Bldg., Springfield, Ill.

Indiana Electric Light Association
President, C. V. Sorenson, Central Indiana Power Co., Indianapolis, Ind.; *Secretary-Treasurer*, William Stokes, 1548 Consolidated Bldg., Indianapolis, Ind.

Michigan Electric Light Association Section
President, E. L. Edward, Michigan Electric Power Co., Lapeer, Mich.; *Secretary-Treasurer*, Herbert Silvester, The Detroit Edison Co., Ann Arbor, Mich.

Wisconsin Utilities Association
President, G. W. Van Derzee, Milwaukee Electric Railway & Light Co., Milwaukee, Wis.; *Executive Secretary*, John N. Cadby, 502 Brumder Bldg., 105 Wells St., Milwaukee,, Wis.

*Middle Atlantic Division

(*To Consist of Delaware, District of Columbia, Maryland, Virginia*)

Maryland Utilities Association
President, H. T. Connolly, Washington, Baltimore & Annapolis Electric Railroad Company, Baltimore, Md.; *Secretary*, D. E. Kinnear, United Railways & Electric Company, Baltimore, Md.

Public Utilities Association of Virginia
President, A. W. Higgins, Virginia Public Service Co., Charlottesville, Va.; *Secretary*, A. B. Tunis, 301 East Grace Street, Richmond, Va.

MIDDLE WEST DIVISION

(Iowa, Kansas, Missouri, Nebraska)

President, A. E. BETTIS, Kansas City Power & Light Co., Kansas City, Mo.; *Managing Director,* THORNE BROWNE, 1527 Sharp Bldg., Lincoln, Neb.

Iowa Section

President, C. S. MACY, Iowa Power & Light Co., Adel, Iowa; *Managing Director,* JOE CARMICHAEL, 310 Crocker Bldg., Des Moines, Iowa.

Kansas Section

President, FRANK M. STONE, Kansas Utilities Co., Fort Scott, Kan.; *Secretary,* H. LEE JONES, 820 Kansas Avenue, Topeka, Kan.

Missouri Association of Public Utilities

President, T. J. STRICKLER, Kansas City Gas Co., Kansas City, Mo.; *Secretary-Treasurer,* F. D. BEARDSLEE, 315 North Twelfth Street, St. Louis, Mo.

Nebraska Section

President, C. W. AMIDON, Central Power Co., Grand Island, Neb.; *Managing Director,* THORNE BROWNE, 1527 Sharp Bldg., Lincoln, Neb.

NEW ENGLAND DIVISION

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)

President, C. H. HODSKINSON, The Edison Electric Illuminating Co., Boston, Mass.; *Secretary,* MISS O. A. BURSIEL, Room 1113 Statler Bldg., 20 Providence Street, Boston, Mass.

(This Division Has No State Sections)

NORTH CENTRAL DIVISION

(Minnesota, North Dakota, South Dakota)

North Central Electric Association

President, THOMAS T. PARKER, Northwestern Public Service Co., Huron, S. D.; *Secretary,* JOHN W. LAPHAM, 803-804 Plymouth Bldg., Minneapolis, Minn.

(This Division Has No State Sections)

NORTHWEST DIVISION

(Alaska, Idaho, Montana, Oregon, Utah, Washington)

Northwest Electric Light and Power Association

President, M. L. HIBBARD, Idaho Power Co., Boise, Idaho; *Secretary,* BERKELEY SNOW, Room 1206, Spaulding Bldg., Portland, Ore.

(This Division Has No State Sections)

PACIFIC COAST DIVISION

(Arizona, California, Hawaii, Nevada, Philippine Islands)

Pacific Coast Electrical Association

President, E. B. CRIDDLE, Southern Sierras Power Co., Riverside, Cal.; *Secretary,* SAMUEL H. TAYLOR, Suite 729-730, 447 Sutter Street, San Francisco, Cal.

Arizona Utilities Association

President, M. A. POOLER, Tucson Gas, Electric Light & Power Co., Tucson, Ariz.; *Secretary,* L. C. MCCULLOUGH, 134 South Central Avenue, Phoenix, Ariz.

ROCKY MOUNTAIN DIVISION

(Colorado, New Mexico, Wyoming)

President, W. D. JOHNSTON, Mountain States Power Co., Casper, Wyo.; *Secretary,* O. A. WELLER, Public Service Co. of Colorado, Denver, Colo.

The Colorado Utilities Association

President, H. S. ROBERTSON, Denver Tramway Corp., Denver, Colo.; *Secretary,* O. A. WELLER, Public Service Co. of Colo., Denver, Colo.

New Mexico Utilities Association

President, W. W. NIELSEN, New Mexico Power Co., Santa Fe, N. M.; *Secretary-Treasurer,* BERNARD L. WILES, Albuquerque Gas & Electric Co., Albuquerque, N. M.

Wyoming Utilities Association

President, W. D. JOHNSTONE, Mountain States Power Co., Casper, Wyo.; *Secretary,* F. A. PROBST, Mountain States Telephone & Telegraph Co., Casper, Wyo.

SOUTHEASTERN DIVISION

(Alabama, Cuba, Florida, Georgia, North Carolina, South Carolina, Tennessee, Porto Rico)

President, T. H. TUTWILER, Memphis Power & Light Co., Memphis, Tenn.; *Secretary,* C. M. KILIAN, 207-8 Bona Allen Bldg., Atlanta, Ga.

SOUTHWESTERN DIVISION

(Arkansas, Louisiana, Mississippi, Oklahoma, Texas)

President, FRED W. INSULL, Public Service Co. of Oklahoma, Tulsa, Okla.; *Secretary,* S. J. BALLINGER, San Antonio Public Service Co., San Antonio, Tex.

Arkansas Utilities Association

President, W. E. BANN, Southwestern Gas & Electric Co., Texarkana, Tex.; *Secretary,* R. I. BROWN, Arkansas Central Power Co., Little Rock, Ark.

Mississippi Electric League

President, A. H. JONES, Jones-Johnson Co., McComb, Miss.; *Secretary,* A. R. RIDDICK, A. G. Riddick, Inc., Jackson, Miss.

Oklahoma Utilities Association

President, THOMAS R. WEYMOUTH, Oklahoma Natural Gas Corp., Tulsa, Okla.; *Secretary,* EDWARD F. MCKAY, 1020 Petroleum Bldg., Oklahoma City, Oyla.

Southwestern Public Service Association

President, KNOX LEE, Southwestern Gas & Electric Co., Marshall, Tex.; *Secretary,* E. N. WILLIS, 403 Slaughter Bldg., Dallas, Tex.

***Note: This Division is in Process of Formation.**

SECTIONS, BUREAUS AND COMMITTEES

Chairmen's names only listed here

SPECIAL NATIONAL COMMITTEES

Advertising Committee—(To be determined.)

Charles A. Coffin Prize Committee—M. S. SLOAN, The New York Edison Co., New York, N. Y.

Codes and Standards Committee—IRVIN W. DAY, The Connecticut Light & Power Co., Waterbury, Conn.

Constitution and By-Laws Committee—R. F. PACK, Northern States Power Co., Minneapolis, Minn.

Electrification of Steam Railroads Committee—BRITTON I. BUDD, Public Service Co. of Northern Illinois, Chicago, Ill.

Exhibition Committee—E. W. GOLDSCHMIDT, Wagner Electric Corp., New York, N. Y.

Finance Committee—SIDNEY Z. MITCHELL, Electric Bond & Share Co., New York, N. Y.

Lamp Committee—FRANK W. SMITH, The United Electric Light & Power Co., New York, N. Y.

Prize Awards Committee—W. H. ONKEN, JR., *Electrical World,* New York, N. Y.

Public Policy Committee—P. S. ARKWRIGHT, Georgia Power Co., Atlanta, Ga.

Rate Research Committee—L. R. NASH, Stone & Webster, Inc., Boston, Mass.

Water Power Development Committee—PAUL A. SCHOELLKOPF, The Niagara Falls Power Co., Buffalo, N. Y.

GENERAL NATIONAL COMMITTEES

***Civic Development Committee**—JOHN B. REYNOLDS, Middle West Utilities Co., Chicago, Ill.

***Educational Committee**—FRED R. JENKINS, Commonwealth Edison Co., Chicago, Ill.

***Insurance Committee**—W. H. SAWYER, Stevens & Wood, Inc., New York, N. Y.

***Membership Committee**—A. JACKSON MARSHALL, National Electric Light Association, New York, N. Y.

***Rural Electric Service Committee**—EUGENE HOLCOMB, Consumers Power Co., Jackson, Mich.

ACCOUNTING NATIONAL SECTION

***Section's Executive Committee**—W. R. EMERSON, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

Budget Committee—B. F. RODEY, The United Electric Light & Power Co., New York, N. Y.

***Classification of Accounts Committee**—H. C. HASBROUCK, H. C. Hopson & Co., New York, N. Y.

***Customers' Records Committee**—E. W. KORSMEYER, Henry L. Doherty & Co., New York, N. Y.

Exhibit Committee—T. A. WALLACE, Henry L. Doherty & Co., New York, N. Y.

***Fixed Capital Committee**—THOMAS M. FORD, The Philadelphia Electric Co, Philadelphia, Pa.

***General Records Committee**—C. E. MCBRIDE, Electric Bond & Share Co, New York, N. Y.

***Purchasing and Storeroom Committee**—K. C. CAMPBELL, The Detroit Edison Co., Detroit, Mich.

***Statistics Committee**—HARRY A. SNOW, The Detroit Edison Co., Detroit, Mich.

COMMERCIAL NATIONAL SECTION

***Section's Executive Committee**—MARSHALL E. SAMPSELL, Central Illinois Public Service Co., Chicago, Ill.

***Commercial and Industrial Power and Heating Bureau**—V. M. F. TALLMAN, Charles H. Tenney & Co., Boston, Mass.

Commercial Cooking Committee—O. WILHELMY, The Union Gas & Electric Co., Cincinnati, Ohio

General Power Committee—H. C. THUERK, Associated Gas & Electric System, New York, N. Y.

Industrial Heating Committee—J. L. FADEN, The Edison Electric Illuminating Co., Boston, Mass.

***Lighting Bureau**—M. E. SKINNER, New York Power & Light Corp., Albany, N. Y.

Commercial and Industrial Lighting Committee W. H. HORTON, JR., West Penn Power Co., Pittsburgh, Pa.

Electrical Advertising Committee—C. J. EATON, Middle West Utilities Co., Chicago, Ill.

Home Lighting Committee—W. T. BLACKWELL, Public Service Electric & Gas Co., Newark, N. J.

Street Lighting Committee—R. J. MALCOMSON, Public Service Co. of Northern Illinois, Chicago, Ill.

***Merchandising Bureau**—FRANK D. PEMBLETON, Public Service Electric & Gas Co., Newark, N. J.

Domestic Electric Range Committee—FRANK A. COUPAL, Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.

Merchandise Sales Committee—C. L. HAROLD, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

Refrigeration Committee—C. L. DUNN, The Ohio Public Service Co., Cleveland, Ohio.

Water Heating Committee—NORMAN T. WILCOX, Stone & Webster, Inc., Boston, Mass.

***Customer Relations Committee**—H. T. EAST, Public Service Co. of Northern Illinois, Chicago, Ill.

***Wiring Sales Committee**—A. P. GOOD, Commonwealth Edison Co., Chicago, Ill.

ENGINEERING NATIONAL SECTION

***Section's Executive Committee**—A. D. BAILEY, Commonwealth Edison Co., Chicago, Ill.

***Accident Prevention Committee**—C. R. BEARDSLEY, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

***Electrical Apparatus Committee**—R. A. HENTZ, The Philadelphia Electric Co., Philadelphia, Pa.

Engineering Administration Committee—W. E. MITCHELL, Georgia Power Co., Atlanta, Ga.

Engineering Research Committee—C. F. HIRSHFELD, The Detroit Edison Co., Detroit, Mich.

***Hydraulic Power Committee**—BYRON E. WHITE, Utica Gas & Electric Co, Utica, N. Y.

***Inductive Coordination Committee**—H. L. WILLS, Georgia Power Co, Atlanta, Ga.

***Meter Committee**—A. S. ALBRIGHT, The Detroit Edison Co, Detroit, Mich.

***Overhead Systems Committee**—SYDNEY ALLING, The Rochester Gas & Electric Corp., Rochester, N. Y.

***Power System Engineering Committee**—L. W. W. MORROW, *Electrical World,* New York, N. Y.

***Prime Movers Committee**—R. D. DEWOLF, The Rochester Gas & Electric Corp., Rochester, N. Y.

***Underground Systems Committee**—G. C. MCCABE, The Detroit Edison Co., Detroit, Mich.

PUBLIC RELATIONS NATIONAL SECTION

***Section's Executive Committee**—HARRY REID, National Electric Power Co., New York, N. Y.

***Cooperation with Educational Institutions**—JOHN F. GILCHRIST, Commonwealth Edison Co., Chicago, Ill.

***Customer Ownership**—W. H. HODGE, Byllesby Engineering & Management Corp., Chicago, Ill.

***Industrial Relations Committee**—HOMER E. NIESZ, Commonwealth Edison Co., Chicago, Ill.

***Information Bureau Committee**—T. A. KENNEY, Allied Power & Light Corp., New York, N. Y.

Manufacturers' Advertising Committee—(To be determined.)

***Public Speaking Committee**—W. S. VIVIAN, Middle West Utilities Co., Chicago, Ill.

***Relations with Financial Institutions Committee**—CHARLES B. STUART, Halsey Stuart & Co., New York, N. Y.

***Women's Committee**—MISS SARA HARRIS, Utica Gas & Electric Co., Utica, N. Y.

***Provision is made for a representative from each Geographic Division.**

CONVENTIONS AND MEETINGS

Meeting of the Section, Bureaus and Committees of the National Electric Light Association are shown in roman type; those of other associations in italics

1929

November

11–12 Public Information Bureau Directors, Edgewater Beach Hotel, Chicago, Ill.

18 Educational Committee, Mount Royal Hotel, Montreal, Can.

21–22 Public Utilities Association of Virginia, Chamberlain-Vanderbilt Hotel, Old Point Comfort, Va.

26 Insurance Committee, N. E. L. A. Headquarters, 420 Lexington Ave., New York, N. Y.

December

2–4 Conference of Utility Association Secretaries, Drake Hotel, Chicago, Ill.

2–4 *American Institute of Electrical Engineers, Regional meeting, Chicago, Ill.*

2–6 *American Institute of Mechanical Engineers, Annual meeting, New York, N. Y.*

4–7 *American Society of Refrigerating Engineers, New York, N. Y.*

January

13–14 Accident Prevention Committee, N. E. L. A. Headquarters, 420 Lexington Ave., New York, N. Y.

16–17 Lighting Bureau Committees, Hotel Schenley, Pittsburgh, Pa.

20–21 North Central Electric Association, Commercial Section, St. Paul Hotel, St. Paul, Minn.

23–24 Overhead Systems Committee, Baltimore, Md.

27–31 *American Institute of Electrical Engineers, Santa Monica, Cal.*

February

24–25 Accounting National Section Group Committee Meetings, Book Cadillac Hotel, Detroit, Mich.

24–25 North Central Electric Association, Engineering Section, Nicollet Hotel, Minneapolis, Minn.

March

10–13 Engineering National Section, Group Committee Meetings, Edgewater Beach Hotel, Chicago, Ill.

April

23–25 Middle West Division, Des Moines Hotel, Des Moines, Iowa.

28–30 *Chamber of Commerce of U. S. A., Washington, D. C.*

May

1–2 *Chamber of Commerce of U. S. A., Washington, D. C.*

12–16 *National Fire Protection Association, Atlantic City, N. J.*

June

11–12 North Central Electric Association, Managerial, Alex Johnson Hotel, Rapid City, S. D.

16–20 NATIONAL ELECTRIC LIGHT ASSOCIATION, EXPOSITION AUDITORIUM, SAN FRANCISCO, CAL.

16–25 *World Power Conference, Berlin, Germany.*

23–27 *American Institute of Electrical Engineers, Toronto, Can.*

NEW MEMBERS

Light and Power Companies, Employees of Light and Power Companies, Invited Persons, Manufacturing Companies, Employees of Manufacturing Companies, Associated Companies, Employees of Associated Companies and Foreign Organizations who have recently become Members of the National Electric Light Association.

NOTE: Names of new individual members are shown in the following order: First, in italics, post office address of company employing new members, and on the same line, in Roman letters, the name of the company employing new members; on succeeding indented lines, names of new members followed by post office address.

Electric Light and Power Companies (Class A)

Nebraska, Scottsbluff, The Western Public Service Company

Employees of Electric Light and Power Companies (Class B)

Alabama, Birmingham, Alabama Power Company
    R. H. Freese
    Jno. F. Young (Montgomery, Ala.)

California, Fresno, San Joaquin Light & Power Corp.
    James A. Mulkey
    G. L. Perrin

California, Los Angeles, Los Angeles Gas and Electric Corp.
    J. B. Prewett

California, Riverside, The Southern Sierras Power Company
    John S. Allan

California, San Francisco, Great Western Power Company of California
    Ernst E. Behr
    Arnold B. Gerhan

California, San Francisco, Pacific Gas & Electric Company
    R. G. McDonald (Eureka, Cal.)

California, Santa Cruz, Coast Counties Gas & Electric Company
    Don A. McCullough

Connecticut, Hartford, The Hartford Electric Light Company
    B. R. Foote
    J. William Lancto (Wethersfield, Conn.)
    Theodore Newcomb

Connecticut, Stamford, The Stamford Gas & Electric Company
    John W. Clark
    Prentice M. Hatch

Connecticut, Waterbury, The Connecticut Light & Power Company
    G. E. Cockings (Bristol, Conn.)
    Roy E. Darroch (New Britain, Conn.)
    Charles A. Duggan (Bristol, Conn.)
    Raymond O. Mills
    Richard P. Peale (Hartford, Conn.)
    C. George Rathke (Greenwich, Conn.)
    Robert P. Welton (Bristol, Conn.)

Georgia, Atlanta, Georgia Power Company
    G. F. Smith (Tallulah Falls, Ga.)

Illinois, Chicago, Commonwealth Edison Company
    John W. Baring
    M. P. Below
    Richard Buracker
    John A. Craig
    Robert L. Farrow
    Stanley E. Goodell
    Walter Meyer
    John P. Tegel

Illinois, Chicago, Illinois Power and Light Corporation
    S. L. Hilyard (East St. Louis, Ill.)
    J. E. Strong (East St. Louis, Ill.)

Illinois, Chicago, Public Service Company of Northern Illinois
    Leslie C. Bieger (Forest Park, Ill.)
    Clive R. Bishop

Illinois, Waukegan, Public Service Company of Northern Illinois
    Murray R. Boess
    John M. Clifton (Evanston, Ill.)
    O. B. Dorsey (Chicago, Ill.)
    Harold T. Eddy (Chicago, Ill.)
    D. V. Forester (Harvey, Ill.)
    Frank J. Kerous (Oak Park, Ill.)
    E. Bernhard Klemola (Evanston, Ill.)
    Elmer Malmquist (Blue Island, Ill.)
    J. R. Martin (Chicago, Ill.)
    A. J. Mitchell (Joliet, Ill.)
    Robert M. Ploetz (Chicago, Ill.)
    C. W. Port (Joliet, Ill.)
    Joseph G. Rogers (Oak Park, Ill.)
    C. G. Schlegel
    E. D. Sheehan (Evanston, Ill.)

Maine, Augusta, Central Maine Power Company
    M. A. Perkins, Jr. (Lewiston, Me.)

Maine, Portland, Cumberland County Power & Light Company
Fred W. Marshall (York Harbor, Me.)
A. D. Welch (Kennebunkport, Me.)

Massachusetts, Boston, Edison Electric Illuminating Co. of Boston
Clara T. Durgin
Robert W. Mitchell

Massachusetts, Boston, New England Power Company
Harry Hanson

Massachusetts, Boston, Stone & Webster, Inc.
Alan D. Duff

Massachusetts, Boston, Twin State Gas & Electric Company
G. A. Walter (St. Johnsbury, Vt.)

Massachusetts, Brockton, Edison Electric Illuminating Co. of Brockton
Carl G. Polson
LeRoy B. Witcher

Massachusetts, Cambridge, Cambridge Electric Light Company
Leslie J. Kewer (Dorchester, Mass.)

Massachusetts, Fitchburg, Fitchburg Gas & Electric Light Company
Wm. J. Marlowe

Massachusetts, Franklin, Union Light & Power Company
John F. Conroy

Massachusetts, Gardner, Gardner Electric Light Company
Edna M. Joslin

Massachusetts, Lawrence, Lawrence Gas & Electric Company
Reginald J. Griffin
Harry J. Trees
Joseph T. Wade

Massachusetts, Lowell, The Lowell Electric Light Corporation
L. Alford Frost
John Arthur Hunnewell
Clayton M. Williamson

Massachusetts, Manchester, The Manchester Electric Company
Leon O. Holmes (So. Manchester, Conn.)

Massachusetts, Plymouth, Plymouth Electric Light Company
Fred L. Raymond

Missouri, Kansas City, Kansas City Power & Light Company
Harry A. Brunner (North Kansas City, Mo.)
Grace B. Sexton (North Kansas City, Mo.)

New Hampshire, Portsmouth, New Hampshire Gas & Electric Company
Nelson T. Wright

New Jersey, Newark, Public Service Electric & Gas Company
A. Ward Ackerman (Passaic, N. J.)
Richard H. Barker
A. R. Dunning (Orange, N. J.)
Cecil W. Guyatt
George Marshall

New York, Brooklyn, Brooklyn Edison Company, Inc.
Henry F. Ahrens
L. Lucile Hanan
Louis C. Pils
Reginald J. Snyder
Frank W. Stahl

New York, Mt. Vernon, Westchester Lighting Company
Newton D. LeFevre (Yonkers, N. Y.)
Herbert F. Miller (Yonkers, N. Y.)
Thomas J. Murtha (Bronx, N. Y.)
M. Elizabeth Robbins
William H. von Lampe (Yonkers, N. Y.)

New York, New York, Bronx Gas & Electric Company
Harry J. Blanck
John L. Hart (Fair Haven, N. J.)
Ruth D. Kruger (Bronx, N. Y.)

New York, New York, The New York Edison Company
Gustav H. Raap (Bronx, N. Y.)
Arthur C. Trayer (Valley Stream, L. I., N. Y.)

New York, New York, The United Electric Light & Power Company
James V. Brady (Maspeth, L. I., N. Y.)

New York, Yonkers, Yonkers Electric Light & Power Company
T. G. Brooks
Clifton A. Burriss
Lois M. Payne
Philip Polito

New York, Poughkeepsie, Central Hudson Gas & Electric Corporation
R. E. Decker (New Paltz, N. Y.)
E. D. Ketcham
H. A. McLaughlin
Thomas P. Waye (Saugerties, N. Y.)

North Carolina, Raleigh, Carolina Power & Light Company
W. Henry Horne, Jr.
Randolph M. Hull

Ohio, Columbus, The Columbus Railway, Power & Light Company
E. E. Grover

Ohio, Columbus, The Columbus Railway Power & Light Company
T. A. Bangs
A. C. Beck

Ohio, Columbus, The Ohio Utilities Company
C. G. Neff

Oregon, Portland, Pacific Power & Light Company
L. A. Dick (Dayton, Wash.)
Leo Forsythe (Enterprise, Ore.)
Richard M. Hopper (Goldendale, Wash.)
L. R. Sheeley (Bend, Ore.)
M. C. Thorne (Pomeroy, Wash.)

Pennsylvania, Pittsburgh, West Penn Power Company
Otto John Schaeffer

Pennsylvania, Reading, Metropolitan Edison Company
Howard B. Allen (York, Pa.)

Pennsylvania, Allentown, Pennsylvania Power & Light Company
R. K. McMaster

Tennessee, Bristol, Bristol Gas & Electric Company
Joe H. Grubbs

Tennessee, Bristol, Bristol Gas & Electric Company
Ben A. Fleshman

Tennessee, Chattanooga, Southern Cities Power Company
W. W. Carlton (Shelbyville, Tenn.)

Tennessee, Johnson City, Tennessee Eastern Electric Company
R. F. Lander

Tennessee, Kingsport, Kingsport Utilities, Incorporated
E. W. Hogg

Tennessee, Knoxville, Knoxville Power & Light Company
N. A. Taggart

Tennessee, Memphis, Memphis Power & Light Company
Ward Barnum
Robert Bruce
W. N. Ford

Vermont, Rutland, Vermont Hydro-Electric Corporation
Fred J. Gokey (Claremont, N. H.)

Washington, Aberdeen, Grays Harbor Railway & Light Company
L. G. McClellan

Wisconsin, Milwaukee, The Milwaukee Electric Railway & Light Company
Lawrence J. Beckwith

Canada, Ontario, Ottawa, Gatineau Power Company
R. H. Barber (New York, N. Y.)
H. C. Scott (New York, N. Y.)

Manufacturing Companies (Class D)

Illinois, Chicago, The Frederick Company

Employees of Manufacturing Companies (Class E)

Connecticut, Meriden, The Miller Company
James D. Daly
A. E. Lowe

Connecticut, Waterbury, Beardsley & Wolcott Mfg. Co.
L. M. Pond

Illinois, Chicago, The Frederick Company
H. D. Valentine

Illinois, Peoria, Altorfer Brothers Company
Edward Fairchild (Belmont, Mass.)

Illinois, Chicago, Chicago Flexible Shaft Company
Samuel Wells (Seattle, Wash.)

Illinois, Chicago, Edison Electric Appliance Company
H. F. Huggins (San Francisco, Calif.)
Miss Marion Elizabeth Marble (Boston, Mass.)

Iowa, Newton, Automatic Washer Company
Thomas B. Mulgrew (Atlantic, Mass.)

Massachusetts, Worcester, American Steel & Wire Company
F. K. Sawyer

New Jersey, Trenton, John A. Roebling's Sons Company
H. O. Cauldwell (Chicago, Ill.)
James N. Colkitt (Los Angeles, Cal.)
George I. Gheen (Cleveland, Ohio)
George E. Huff (Atlanta, Ga.)
E. C. Low (San Francisco, Cal.)
Harold P. Peabody (Boston, Mass.)
G. E. Walker (Portland, Ore.)

New Jersey, Orange, Thos. A. Edison, Incorporated
Curtis Prout

New York, New York, The Okonite Company
Richard S. Hayes (Chicago, Ill.)

New York, New York, Westinghouse Lamp Company
J. F. O'Brien

New York, New York, Worthington Pump & Machinery Corporation
George E. Freethy (Boston, Mass.)

THE BADGE OF SERVICE
Join!
THE AMERICAN RED CROSS
CORNELIUS HICKS

New York, Rome, Rome Wire Company
David E. Allen (Birmingham, Ala.)

New York, Schenectady, General Electric Company
W. E. Madden (Los Angeles, Cal.)

New York, New York, Otis Elevator Company
William C. Blackwood (Jackson Heights, N. Y.)

New York, New York, Safety Cable Company (Division of General Cable Corporation)
J. E. Harrall (Philadelphia, Pa.)

Ohio, Cleveland, National Lamp Works of G. E. Co.
M. E. Learnard (Providence, R. I.)

Ohio, Mansfield, Westinghouse Electric & Mfg. Co.
John H. Spraggon (New Haven, Conn.)

Ohio, Mansfield, Westinghouse Electric & Mfg. Company
A. E. Enger (San Francisco, Cal.)
D. C. Harker (San Francisco, Cal.)
C. G. Ong (Lester, Pa.)

Pennsylvania, Pottstown, Automatic Electric Heater Company
Paul V. Quick (Berkeley, Cal.)

Associated Companies (Class F)

Massachusetts, Wellesley Hills
Alton D. Adams (Consulting Engineer)

New York, New York, Westinghouse Electric Supply Company

Employees of Associated Companies (Class G)

Connecticut, Stamford, F. A. Bartlett Tree Expert Company
W. Wilson Heinitsh (Cynwyd, Pa.)
George B. Muth (Cynwyd, Pa.)
George Peabody, Jr. (Cynwyd, Pa.)
A. F. W. Vick (Cynwyd, Pa.)

Missouri, Kansas City, The Chas. L. Ward Company
James Colwell (Omaha, Neb.)

New York, New York, International Standard Electric Corp.
Edmond E. Lincoln

New York, New York, General Contract Purchase Corporation
H. J. Francis

New York, New York, Westinghouse Electric Supply Company
Jack Fly (Little Falls, Minn.)
John J. Gibson
W. J. Smith (Duluth, Minn.)

Wisconsin, Milwaukee, Julius Andrea & Sons Co.
Everell S. Kyle

Foreign Members (Class H)

Scotland, Glasgow, Yarrow & Co. Ltd.

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THE PRESIDENT'S PAGE

Christmas Greetings

THIS is to wish all members of the great electric family a Merry Christmas and a Happy and Prosperous New Year.

Ours is a job of service. Our industry is the nation's power plant. It supplies energy essential to the growth and development of business of every nature and of communities of every size. It lifts the burden of toil from human shoulders and raises standards of living by bringing convenience, comfort, economy, beauty into millions of homes.

Many times it has been said that the truest human happiness is found in useful work. Our jobs, therefore, should yield real happiness throughout the year and prove an inspiration to greater effort in behalf of the public we work for.

President.

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A Voluntary Organization of Companies Engaged In, and Individuals Affiliated With, or Interested In, the Electric Light and Power Industry: "Organized to Advance the Art and Science of the Production, Distribution and Use of Electrical Energy for Light, Heat and Power for Public Service."

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Lexington	3312	Editorial Department

Resources

IN evaluation of the resources of the nation, not enough emphasis has been placed on our greatest asset—the capacities and abilities of men.

Among the impressions gained from the recent meeting in Washington of some three hundred business men under the chairmanship of Mr. Julius Barnes, one in particular stood out. That was: The energy, initiative, intelligence and progressiveness of the business men in the conference is the most positive of all the assurances of future progress. Under their direction, the great construction and development programs will, from typewritten budget estimates, translate into production of steel, equipment materials, automobiles, power houses, goods, and services. Mirrored in those attending the conference were the pulsating energies of the millions of Americans who daily apply in most vigorous fashion President Hoover's sound suggestion—WORK.

None present at the conference could help but be impressed with the interdependence and interlinkage of the various elements which go to make up the business fabric. "No man liveth unto himself." Certainly, it is clear that no business, no industry or commercial relation lives unto itself. The possibilities of future development and expansion and the immediate performance of every business is intertwined with those of others. So it was, as the leaders of different industries spoke — railroads, steamships, textiles, mining, insurance, public utilties, agriculture, banking, automobiles, chemicals, and many others—there developed the spirit of a new mutual understanding of this interrelation, and a realization that the progress of each depends upon the prosperity of the other.

The electric light and power companies, with their services now extending to homes, factories, mills, shops and transportation, in a peculiar way intertwine and interlace themselves through this whole business fabric. The assurances made by Mr. Sloan of new construction and future progress of the electric light and power companies correctly portray the part they will have in this stupendous undertaking of business team play.—P. S. C.

Keeping Promises

DECREASES in rates for domestic service during 1929 will average more than 5 per cent for the country as a whole, if, as is more than likely, the figures for the last four months of the year show the same rate of decrease as was apparent up to September 30.

The trend of rates for electricity has been consistently downward since the organization of the electrical industry as such, but more particularly has this been true during the last few years—or since large scale consolidations have become the rule.

In the effecting of such consolidations and interconnections, the public was promised, actually or tacitly, improved service and a lowering of rates wherever, and whenever consistent with the maintenance of good service, and with due regards for future expansion demands.

These promises are being magnificently honored. Hardly a month passes without the recording of some major example of a benefit of interconnection. The more spectacular of these being, of course, the relief afforded areas stricken by the elements. Cost of electric service to the consumer has gone down, very largely as the result of voluntary reductions as conditions permitted—and will continue to go down as rapidly as economic conditions warrant.

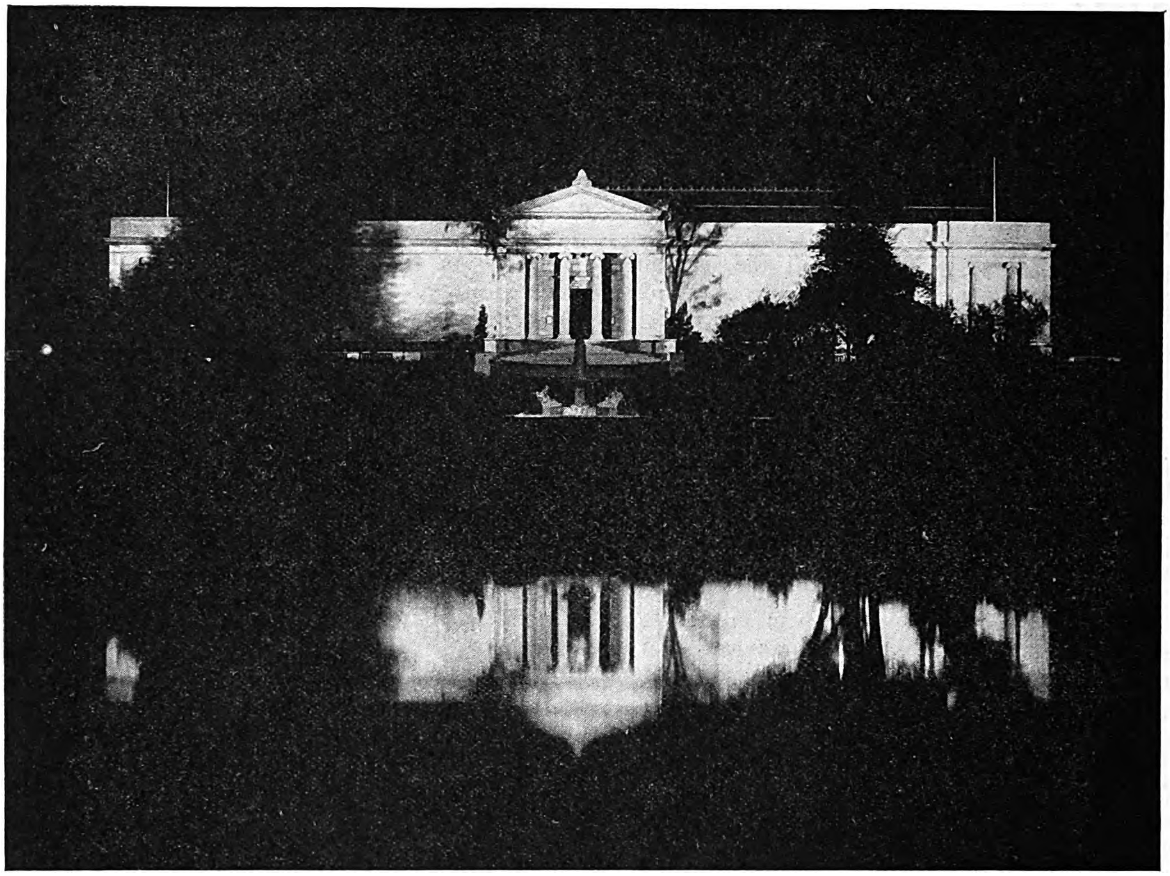
An interesting sidelight on rate reductions is that the percentage of reduction—or the dividend to consumers—will compare not unfavorably with dividends earned for stockholders.

Local Character of Power Supply

TO a steadily increasing degree, electric light and power has become associated with the fortunes of American industry. Three quarters of all manufacturing establishments are now electrified and, out of every three horsepower of motor-driven machinery, two now operate on power purchased from the lines of public utility enterprises.

Not only civic duty, but also enlightened self-interest thus dictate an increasing solicitude toward the fostering of manufacture and the encouragement of industrial development on the part of public utility organizations. It is most encouraging to note, all over the country, the growing activities of the industrial department of electric light and power companies. "Increased industrial activity will mean more business in every direction" states the most recent industrial development bureau "including, of course, an increased load on our power lines. The corporation is undertaking this work not as a matter of philanthropy, but to further its own growth, which is obviously dependent upon the intelligence and foresight with which it serves not merely the communities in which it operates, but the State as a whole."

What more is necessary to point out the inherent interdependence of the utility company and the territory which it serves and to emphasize again the essentially *local* character of electric power supply?



"Moonlighting" the Cleveland Museum of Art

A night-time scene of extraordinary beauty is created by the "moonlighting" of the Cleveland Museum of Art. The lighting system is the gift of The Cleveland Electric Illuminating Company, in commemoration of the fiftieth anniversary of the invention of the first practical incandescent lamp by Thomas Alva Edison.

N·E·L·A·
BULLETIN

December, 1929 Vol. XVI No. 12

Public Utility Construction Program for 1930 Laid Before President Hoover

How It Will Affect Labor and Industry

By PAUL S. CLAPP
Managing Director, National Electric Light Association

AT ten o'clock Wednesday morning, November 27, one of the most representative groups of utility leaders yet assembled gathered in the Cabinet Room at the White House. They were executives from the gas, street railway, and electric light and power fields from all sections of the United States.

Seated about the long table in the historic room they awaited the arrival of President Hoover. They had come at his invitation to assure him and the entire country of the part these utilities will take in the great construction programs for 1930, which, translated into purchase of materials and employment of men, means continuation in the forward march of business.

In the room were two whose lives and work span the whole history of electric power development—Mr. Samuel Insull and Mr. Charles L. Edgar—both rugged pioneers, and early associates of Mr. Edison. Another present was Mr. George B. Cortelyou, who had often sat in this same room as a cabinet officer with Presidents McKinley and Roosevelt. Mr. Owen D. Young who, with all his distinguished service in other fields, still holds electrical progress nearest his heart, was there.

After a short wait the President came into the room from his own office and greeted the assembly.

Mr. M. S. Sloan, President of the National Electric Light Association, in behalf of the electric light and power companies, then read the statement which follows. The information it contained had been gathered by telephone in the forty-eight hours preceding the conference.

Electric Light and Power Statement

> "The electric light and power utility companies of the country contemplate an expenditure during 1930 of $865,000,000 for expansion of their facilities, an increase of $65,000,000 over corresponding expenditures for 1929. This does not include expenditures for maintenance.
>
> "The programs provide for expansion and development in all sections of the United States.
>
> "The electric utilities must maintain themselves in a position to meet increasing demands for service as they develop, and they, therefore, plan their construction well in advance.
>
> "The plans for 1930 are completed, large commitments have already been entered into, and many contracts for equipment and material have been placed. Careful consideration of existing conditions has justified this expansion in anticipation of the growing requirements of industry for power, and consumers generally for increased electric service."

Mr. J. N. Shannahan, of Omaha, in the absence of Mr. Paul Shoup, President of the American Electric Railway Association, presented the electric railway statement, as follows:

Electric Railway Statement

> "A canvass of the electric railway companies of the United States, comprising street car, rapid transit, interurban and bus lines handling approximately 16 billion passengers annually, indicates that 97% of the executives responding to our inquiry do not anticipate that the present stock market situation will affect their capital and maintenance expenditures during the coming year:
>
> "This survey, made at the suggestion of Paul Shoup, President of the American Electric Railway Association, who is unfortunately unable to attend this conference due to his presence on the Pacific Coast, indicates that this industry which during 1929 is spending approximately $1,000,000 a day for maintenance, betterments and extensions, expects to maintain or

exceed this rate of expenditure during 1930.

"At a meeting held at the Association's headquarters in New York on November 26, 1929, representative executives of companies operating in various parts of the country expressed their confidence in the business outlook and their desire to cooperate with President Hoover in every possible way in his effort to stabilize and insure the continued progress and development of business. Analysis of the transportation situation in a number of large cities indicates that as progress is made in bringing about better public understanding of the economic problems involving, improvement in credit will permit considerable increases in capital expenditures to be made for expansion of facilities."

Mr. B. J. Mullaney, President of the American Gas Association, speaking for the gas utilities, both manufactured and natural, made the following statement:

Gas Industry's Statement

"The American Gas Association Statistical Department estimates that expenditures for construction by the manufactured and natural gas industry of the United States in 1930 will aggregate approximately $425,000,000, an increase of about 6% over the corresponding expenditures in 1929. An additional $50,000,000 will be expended to maintain existing service facilities.

"The construction estimate is based primarily upon budget provisions already formulated for 1930 by companies representing the major part of gas production and distribution in the United States. The conclusions thus indicated have been checked against the factual experience of the industry for many years, as well as against current observation and information, and have been correspondingly strengthened.

"Gas industry growth, while unspectacular, has been marked and steady for upwards of twenty years. The latter part of the period has been its time of most rapid gain. Complete statistical reports for nine months, and covering upwards of 85% of the output, indicate that the total output for 1929 should be about 9% ahead of the 1928 total.

"Construction programs have to anticipate this growth, as well as provide for the consequences of new trends and changing conditions, such as more and more large-volume industrial use of gas; accelerated use for additional domestic purposes, including house heating; increased density of population and use where large apartment houses supplant single-family dwellings. Expansion is further stimulated by the growing popular recognition of gaseous fuel advantages and by the research that develops better utilization.

"In the natural gas branch of the industry, the existence of vast known reserves, coupled with large increases in production, is making long distance transmission economically practicable to a degree not anticipated a few years ago. Development along this line will undoubtedly continue for many years.

"These and collateral facts, trends and factors have been coordinated with obvious necessities in estimating the construction requirements of the industry for 1930. The net results, as summed up in the first sentence of this statement, have been reviewed by officers of the larger gas producing and distributing companies, assembled for that purpose at A. G. A. Headquarters in New York yesterday, and have been approved as a reasonable forecast.

"The customer contacts and day-to-day experiences of the companies represented in the conference reflect no disturbing change in business conditions or trends. They suggest no reason at this time for curtailing the contemplated expenditures for the construction and extension of gas service facilities. On the contrary, it is conceivable that cheaper money, as predicted by many forecasters in economics, might accelerate construction especially on the natural gas side of the industry."

Statement for Combined Utilities

With the individual statements for each of the three utilities concluded, a dramatic moment arrived when Mr. Sloan arose to make the combined statement for the gas, street railway and electric light and power utilities. He said:

> "The electric light and power, manufactured and natural gas, and electric railway utilities contemplate the expenditure of $1,400,000,000 during 1930 for new construction and expansion of facilities, an increase over the corresponding expenditures for 1929 of $110,000,000.
>
> "In addition to this amount, they will spend to maintain existing properties $410,000,000."

In this short statement of fifty words, one of the largest construction programs of the country was announced, the full purport of which is almost beyond visual-

© Wide World

UTILITY LEADERS PHOTOGRAPHED ON LAWN OF THE WHITE HOUSE

Those in the group are listed on next page in body of article ization. It means employment of thousands of men in building power houses, transmission lines, dams, laying pipe lines, constructing gas facilities, and extending street railway service. Orders for equipment and material will keep thousands of others employed in factories, mills, and mines producing and fabricating the tons of copper, steel, aluminum, cement, and other materials involved. So complete is the interlinkage of business and industry and so stupendous is this construction program alone, that it may be safely said every citizen benefits.

President Hoover called on those present for statements, one after another. The executives told in their own way of the plans for their own companies. There was no note of uncertainty, no hesitation in the announcement of definite programs of construction already planned and actually under way. The confidence of these executives in the future of these three basic electric utilities which they so completely understand, and in the present stability of business, expresses itself in positive action.

Present at the Conference

Several of those invited were unable to get to Washington in time for the Conference. Those present were:

Barnes, J. P., Pres., Louisville Railway Co., Louisville, Ky.
Bruce, Howard, Chmn., The Bartlett Hayward Co., Baltimore, Md.
Carlisle, F. L., Chmn., Northeastern Power Corp., New York, N. Y.
Clapp, Paul S., Managing Director, Natl. Elec. Lt. Assn., New York,N.Y.
Clifford, G. H., Pres., Stone & Webster Service Co., Boston, Mass.
Cobb, B. C., Chmn., Allied Power & Light Corp., New York, N. Y.
Cortelyou, Geo. B., Pres., Consolidated Gas Company, New York, N. Y.
Couch, Harvey, Pres., Arkansas Pwr. & Lt. Co., Pine Bluff, Ark.
Dame, F. L., Pres., North American Co., New York, N. Y.
Davis, Judge Stephen B., Director, Joint Committee of National Utility Associations, New York, N. Y.
Draper, W. A., Pres., Cincinnati Street Railway Co., Cincinnati, Ohio.
Edgar, Chas. L., Pres., Edison Electric Ill'g Co., Boston, Mass.
Erickson, Halford, V. P., Byllesby Engineering & Management Corp., Chicago, Ill.
Forward, Major Alexander, Managing Director, American Gas Assn., New York, N. Y.
Freeman, W. W., V. P., Columbia Gas & Electric Co., New York, N. Y.
Gadsden, P. H., V. P., United Gas Improvement Co., Philadelphia, Pa.
Gordon, Charles, Managing Director, American Electric Railway Assn., New York, N. Y.
Gossler, P. G., Pres., Columbia Gas & Electric Co., New York, N. Y.
Groesbeck, C. E., Pres., Electric Bond & Share Co., New York, N. Y.
Hannah, J. H., Pres., The Capitol Traction Co., Washington, D. C.
Hulswit, F. T., Pres., American Commonwealth Corp., New York, N. Y.
Insull, Samuel, Pres., Commonwealth Edison Co., Chicago, Ill.
Jones, W. A., V. P., Cities Service Co., New York, N. Y.
McCarter, Thos. N., Pres., Public Service Electric & Gas Co., Newark, N. J.
Miller, John B., Chmn., Southern California Edison Company, Los Angeles, Cal.
Mitchell, S. Z., Chmn., Electric Bond & Share Co., New York, N. Y.
Mullaney, B. J., Pres., American Gas Association (V. P., Peoples Gas Light & Coke Co., Chicago, Ill.).
Paige, C. E., V. P., Brooklyn Union Gas Co., Brooklyn, N. Y.
Richardson, Guy A., V. P. and Gen. Mgr., Chicago Surface Lines, Chicago, Ill.
Robertson, A. W., Chmn., Westinghouse Electric & Mfg. Co., New York, N. Y.
Shannahan, J. N., Pres., Omaha & Council Bluffs St. Ry. Co., Omaha, Neb.
Sloan, M. S., Pres., National Electric Light Assn. (Pres., The New York Edison Co., New York, N. Y.)
Storrs, Lucius S., Exec. Chmn. of Bd., United Railways & Electric Co., Baltimore, Md.
Tenney, A. B., Senior V. P., Charles H. Tenney & Co., Boston, Mass.
Tidd, George N., Pres., American Gas & Electric Co., New York, N. Y.
Wagner, Herbert A., Pres., Consolidated Gas, Electric Lt. & Pwr. Co., Baltimore, Md.
Young, Owen D., Chmn., General Electric Co., New York, N. Y.
Zimmermann, John E., Pres., United Gas Improvement Co., Philadelphia, Pa.

Press Comment on the Conference

No Small Promise

"Insull, of Chicago; Cortelyou, of New York, and Owen D. Young, of Europe, New York and everywhere, have seen the President. They and other industrial stars promise the President to cooperate in his admirable undertaking, promotion of new enterprises, wise spending of money and creation of jobs.

"Their promise is no small one, for they agree to spend eighteen hundred millon dollars on one program.

"What the country needs, if it really needs anything beyond common sense, is to spend part of the money we have, and we have hundreds of billions of it. On past occasions this country has stood petrified, unable to move, like a man watching his house burn down, unable to use his legs or hands."—*Arthur Brisbane, in his syndicated column.*

Eloquent Testimony

" . . . these . . . enterprises (public utilities and railroads) . . . are now relied upon, and not in vain, to assume the leadership in the movement to expand and stabilize the country's business and industry. Their importance as factors in the general prosperity could not be more plainly demonstrated. The immediate and widespread beneficial effect of their pledges of cooperation in the President's program emphasizes the folly of the indiscriminate attacks on these indispensable constituents of the Nation's industrial structure. For they, and not their professional critics, are the ones who today are helping to provide that 'action which counts' in promoting the material welfare of the country. . . . "there could be no more eloquent testimony of these shrewd business men's confidence in the industrial and financial situation than their unanimous decision to proceed with their forward-looking projects, involving even greater investments than in the year now drawing to a close."—*Philadelphia Public Ledger.*

Cooperators for Public Welfare

" . . . It (the conference) showed the people the vast extent of the (public utility) industry, gave new assurance of a mighty coordinated effort on a national scale to stimulate industry, and, what will be most important of all in the long run, showed the public utility men at their typical best as cooperators in a movement for the public welfare. . . .

" . . . The wholesome cooperation which the public utility men offered yesterday will in itself do a great deal to win public sympathy and create a better understanding of the relation of the vast industry to the nation, the states and the public."—*Boston Herald.*

Amplifier Talks to a Distinguished Guest

By AMPLIFIER

IT was about half-past ten one morning last fall when Paul S. Clapp, Managing Director of the National Electric Light Association, asked me to step around to his office. There followed the most interesting two hours I have spent in a long time. What he wanted was to have me meet M. E. O. Meyer, Directeur General Electricite de Strasbourg, a distinguished European visitor who had been making a tour of the United States. Having been called upon on various occasions to chaperon distinguished guests from other countries around the United States, I have always been interested in their reactions whenever they have been willing to talk frankly. M. Meyer was one of these.

TWENTY years ago he came to the United States. For two years he worked in a testing laboratory, then as a draftsman and finally as a designing engineer. Apparently he made it his business to inform himself fully as to working conditions of that time, becoming intimately acquainted with workers as well as with leading business men and financiers. In any event, he left the country two and a half years later enthusiastic over its future—a young idealist having firm and lasting impressions. When he decided to again visit the United States he feared, as he said to me, that he might be disenchanted.

After listening to M. Meyer telling about his experiences with light and power as well as with electrical manufacturing companies in New York, Schenectady, Pittsfield, Buffalo, Niagara Falls, Toronto, Cleveland, Barberton, Detroit, Chicago, St. Louis, Pittsburgh, Harrison, Newark, Philadelphia and Hartford it occurred to me that I might write a good story on his reactions. I didn't do anything about it however until Mr. Clapp received a letter from him. This letter was so interesting, and indicated so definitely what men of his type get out of a visit to this country, that I propose to take it together with my recollection of the things he said to me and give it to the electrical industry as something worth thinking about.

What seems to have surprised him most is the treatment he received in each one of these cities. Every question he asked with regard to management, engineering or operation was answered frankly, and, as he says in his letter to Mr. Clapp, "this broadminded way of dealing even with completely unknown visitors makes it possible to get in a few weeks' journey not just a thorough, but a very deep impression of what is done in your country."

Like almost every other European, and particularly those who spent some time in this country twenty or thirty years ago, M. Meyer was particularly struck with what he calls "progress in wealth." But, unlike most Europeans, his consideration of this question of "wealth" is not confined to simply increase in material things; it goes deeper than this, for apparently he considers wealth as something which is of value only because it makes possible the development of all sorts of other human activities. One of the first things he noted was that while the cost of living has "seriously grown during the last ten years," wages and salaries have been raised with even greater rapidity, "giving each individual a greater margin of expenses." This explains, to his satisfaction, "why nearly every family has an automobile, a radio set and many domestic conveniences." In his opinion, the general welfare of the people of the United States is due to what he calls "a closed circuit, remarkably developed in the States." Increased revenue means greater individual purchasing power, resulting in more business and greater production.

RECALLING that 18 years ago the light and power companies were having a difficult time, M. Meyer rejoices in the fact that they are now prosperous, because, as he says, "their aim has not only been to make money, but first of all to serve." He expressed the greatest astonishment over the length to which these companies will go to satisfy their consumers. To him the "large and expensive telephonic services," as well as the "important commercial and technical staffs" organized solely in the interests of the customers together with "large maintenance and repair costs," are responsible not only for the quality of the service given, but for the confidence of the public which the electrical industry in this country enjoys. He was enthusiastic over the design and equipment of power houses, substations and transmission lines, saying, that while they looked almost "luxurious," he appreciated that the huge expenditures involved make for stability and quality of service.

Again like most Europeans, he was surprised at the tremendous increase in buildings, and particularly "skyscrapers" in the larger cities of the United States, as well as the amount of home building which is going on. To him the response of the building trades to what he calls "the ascendent trend of industrial and commercial life" is remarkable, and he doesn't hesitate to assign credit to the electrical industry. "The electric light and power company," he says, "contributes, so to say, automatically to this development. Without electric light and power, and without steam heating, no huge and tall building is imaginable."

M. MEYER commented on the large scale development of electrical engineering. "The design of power plants," he said, "has brought about a number of important improvements permitting the most economical use of both water and coal. Twenty years ago no one would have dreamed of the present low coal consumption due to high pressure and high temperature, as well as to automatic control, of combustion." He feels, however, that in spite of the progress made during the past 18 years the problem of ash handling "is still susceptible of improvement," and that the question of "smoke suppression still leaves some field of research open." He also spoke of the size and capacity of turbines and alternators, as well as of arc welding, in the most complimentary terms.

"The general use of electrical energy everywhere, which I have noted during my trip," he said, "from the largest to the smallest workshop, through the commercial building to the private house, from cities out to the remote farm, gives one the impression that electricity is the most important factor in the modernization of living and working conditions. The consumer may claim that he offers the opportunity to the light and power industry to serve him, but the fact remains that electricity has been one of the largest contributors to the progress of American manufacturing, business and home keeping methods."

What he particularly appreciated, however, was the scientific manner in which the electrical industry goes about its work. "Engineering," he said, "is not based on routine, but on serious studies of well trained and scientifically brought up engineers. Compared with

(*Continued on page* 817)

Private or Government Ownership of Public Utilities

A Philosophical Dissertation on a Subject of Vital Interest to Everybody

By A. H. MARKWART

PART I.

THOSE aggressive minority groups which advocate government ownership and operation of public utilities raise a broad question of public policy, involving factors that vary according to how we view the subject. If we view it as a matter of national concern, one set of factors comes into play; if we view it as a State problem, another set must be considered, and if we view it as merely a matter of local concern, still another set must be applied.

The proposal of the advocates of government ownership to substitute public ownership and political operation for private capital and private initiative in the business of rendering utility service, is a radical departure from the traditions of American economic thought and practice. Consequently, the burden of demonstrating the wisdom and the economic soundness of the new or substitute method rests on those who advocate the change. The responsibility is upon them to prove that their methods are economically and politically sound, and that there is valid reason for expecting that service under the new system will be more satisfactory than it is under our present system of private ownership regulated by public authority.

In other words, all presumptions are in favor of private ownership and operation as against public ownership or operation.

I approach this discussion from a national and State, rather than from a community viewpoint, simply as an American citizen and observer, whose experience along lines of constructive activity has caused him to view problems concretely, rather than academically or abstractly. To me, the case history of a problem is more important than *a priori* theories. As an engineer, employing observation as a basis for judgment, I feel that the basic cause of our social and economic advance lies in the fact that it has been stimulated by individual need and ambition and guided by individual enterprise and initiative. It seems to me that the lavish contribution made to society by the intelligence, vision, and scientific imagination that has built up the utility corporations, and the facilities that have produced the marvelous results visible in America, is the justification of private ownership of public utilities under regulation.

Mr. Markwart is Vice-President in Charge of Engineering, Pacific Gas & Electric Company, San Francisco. This address was delivered in September before the Public Utilities Section of the Commonwealth Club, San Francisco

Nowhere is commercialism so dominant as in the United States, yet nowhere is there a greater degree of idealism, but this idealism is practical, rather than Utopian, consisting as it does of a spirit of service and an enlightened economic policy which combines low unit cost to the consumer, equitable distribution of reward to the mental and manual producers, and a return for capital appropriate to the risk to insure its continued flow to industry. This idealism, which permeates the whole of modern business, was not deliberately established, nor has it been consciously directed. It grew out of experience, and evolved, as did most of the institutions which favorably affect our economic welfare. It is one of the characteristics of the spirit of America, and is a concrete expression of the mass production technique of our times.

The proposal to establish government, in lieu of private ownership as an American principle is based fundamentally on the idea that a new industrial order is desirable. As a start, small groups are striving to have the scope of socialized control, which now covers such functions as postal service, education, police and fire protection, extended to embrace certain of our industrial activities, and particularly those which operate under our established and accepted regulatory system. It may be characterized as a minor trend toward collectivism, like that which obtains to the fullest measure in Russia and in part in Germany and Czecho-Slovakia and in certain cities of Europe, notably Vienna. In the United States, the government ownership movement is against the privately-owned public utilities, and of late especially the electric utilities, on the basis of community ownership, rather than State or federal ownership.

But utility operation, usually a highly technical commercial undertaking, in my belief is not economically adaptable to government control. Government management cannot escape political control; it cannot introduce that personal interest which is so essential to business enterprise; cannot eliminate the evils of democratic management; cannot produce a flexible internal operation; nor can it always obtain the support of the voter in financing for expansion, or secure the finest public relations and enthusiastic sales effort; nor has it been able successfully to coordinate and advance the technical phases, particularly in those utilities, notably the electric, the art of which is not fully stabilized. In other words, when promotion and reward go by political favor, rather than by merit, there is no incentive to invention and improvement; consequently the art and the service make no progress.

From Early Times

AS far back as the dawn of history, government has attempted to regulate the industry of individuals. Since earliest times, under varying economic and social conditions and circumstances, government has occasionally owned and operated the machinery of production, including agricultural, transportation, and mercantile enterprises. Road building and harbor works have been common examples of governmental activity.

Viewed broadly, the societies of antiquity were based upon human slavery and a vast proletariat. Owing to the insecurity of life and property, the individual lacked the incentive and was denied the protection necessary to the accumulation of private capital.

Thus we find the Egyptian governments supporting and encouraging, if not at times actually directing, agriculture and cattle-raising, the two principal industrial activities of the time, as a matter of State policy.

What Plutarch says leads us to surmise that Pericles caused many things to be done by the Athenian government: the construction of buildings for amusement and worship and other works which were monuments of glory to the State, in addition to various pensions, gratuities and diversions at the public expense.

Men ever have philosophized upon the ideal State. One may say safely that our modern disciples of government ownership are followers, to some extent, of Plato, who regarded the ideal State as one in which the individual is completely subordinated to the State, and community of property is established. On the other hand, those who support the institution of private property agree with Aristotle, who, opposed to the communism of Plato, advocated personal freedom, individual initiative and private property. The rationalism of Aristotle as compared with the idealism of his teacher Plato, marked an advance in Grecian economic thought during the lives and times of those great philosophers.

Because Rome was interested primarily in conquest and politics, her governmental enterprises were limited to the lending of money which had come into her coffers as tribute and to the receipt and distribution of food stuffs and plunder from her dependencies. Economic activity in the usual sense, excepting agriculture, therefore played but little or no part in Roman life.

In the medieval period, industry was an incident in a world dominated by theology and law, and economic doctrines were controlled by religious considerations. The taking of interest was condemned, the pursuit of wealth for the sake of having it was regarded as one of the seven deadly sins, and society seemed more concerned with the spirit than with the flesh.

With the sixteenth and seventeenth centuries there came a marked change in economic thought, and we encounter a number of writers speculating on the various factors that contributed to the promotion of the wealth of nations. People began to regard matters which affected a nation's finance and commerce separately from those relating to its politics and morals, though they were still confused in their ideas of private wealth as distinguished from public wealth.

The major economic philosophy of our own times is unmistakably that of individualism; the minor, that of collectivism, otherwise known as socialism, communism or syndicalism, depending upon the means advocated for changing or overturning the established order of society.

In the United States, where, despite marvelous economic achievement, we are still advancing, with natural resources still to be developed, optimism and common sense prevail, rather than the pessimism and abstraction which tinctured some of the schools of thought of the recent past.

Now the idea of enterpriser's profits is regarded by the majority of the people as sound and in the public interest, and the economic value of individual initiative is highly appraised. Yet, despite a tremendous accumulation of public wealth and its ready explanation, there is in this country today, oddly enough when we consider the principles upon which our government was founded, a group temperamentally inclined to the idea that economic salvation is to be had only through government ownership of certain of our production and service agencies. This group includes the so-called modern socialists of the several moderate types who would educate the people to a belief in government ownership, with a view to bringing this about by parliamentary methods, instead of through direct action.

National Ownership

THE tendency for government to do more than govern is not confined to the remote past. We might recall the provision in our Federal Constitution, to the effect that "Congress shall have the power to establish Post Roads and Post Offices," in order to secure the intellectual, social and material advancement of the people. While the national government has undertaken such enterprises to increase the stability and promote the welfare of the individual, it has never sought to increase or expand these functions in relation to transportation or communication. Our legislators had the power to develop these utilities, but have consistently refused to do so, either because such activity was not in accord with the American statesman's view of the functions of the federal government, or because the necessary incentive was lacking.

The obstacles to the nationalization of the public utilities seem almost insurmountable. Our very form of national government in its relation to State sovereignty stands as a barrier, when we recall the principles on which it was founded. The idea is un-American and certainly contrary to the thought of the framers of the Constitution.

The Constitution gives Congress the power to appropriate money to pay the debts, and to provide for the common defense and the general welfare of the United States. These three are the only purposes for which the public funds may be expended. Under this stipulation certain road, river and harbor improvement bills in the past have met with the Presidential veto on the score that they were not clearly for national, as distinguished from State or local, welfare. In such cases, encroachment upon the rights of States or individuals does not seem to have been the danger to be feared but rather local advantage and its trial of government patronage, and the tendency to run to Washington for those things which it is the duty of the States to provide.

If these things may not properly be done by our national government, we shall have to stretch our imagination to justify the opinion that it may administer the processes of production, buying and selling, particularly if we also take note of the constitutional provision that money raised by the government must come from "Taxes, duties, imports and excises." This may be interpreted to mean that the federal government has the power to raise needed money by any of the known methods of taxation, but not by trade.

Such a radical extension of the powers of the national government would be possible only after basic changes were made in the fundamental law and practices of our government. Such changes would have to be predicated upon a scientific examination of the very structure of the Nation, its history, customs, laws and institutions, and a careful inquiry into the relation between the Nation and the States, as far as they would affect, or would be affected by, such a revolutionary act.

As a practical matter, it is unlikely that the national government will ever undertake to render domestic water, gas, electric or transportation service, despite the fact that there is interstate business done in each of these, except water. It does render postal service, but it never has made a signal advance in communications, with the possible exception of the air mail service, and there seems to be no desire to postalize our private telephone and telegraph systems. On the other hand, the development and advance of the railroad systems, ocean navigation, wire and air communication, and gas and electric service, under private initiative have been beyond all expectations.

In justice to our government, which we love and esteem, let me say that obviously such development and advance could not be made by *any* government, because progress would be discouraged for lack of incentive. Forward movement must always be had through the individual who sees some form of gain as his reward for personal effort.

It is our American institutions, however, which have caused men to want to create these things and which have permitted them to accumulate their private wealth in their own way. Our federal government, in confining itself to the task of governing, has, in effect, voluntarily stood aside and encouraged individuals to make inventions and discoveries and to pool their business interests in great utility corporations. It allows these corporations to have personalities so that they, like men of enterprise, may exercise initiative in the hope of profit.

Indeed, the federal government has been most studious to avoid an invasion of the public utility field, undertaking such invasion as an incident only to a major project, the development of which was considered necessary to the promotion of the general welfare.

In illustration of the statement that the Federal Government is limiting itself to those things which affect the public welfare, the Federal Water Power Act of 1920 may be cited. The purpose of this legislation was largely to encourage water power development by others than the national government on the public lands and navigable streams over which Congress has jurisdiction. The Act was prompted by the necessity of correcting the intolerable situation at the time, by reason of indefinite tenure and possible arbitrary revocation, which practically prohibited private capital from venturing into water power development on national lands and waters. This Act is comprehensive but not objectionable, since it makes no radical extensions of the functions of our national government, while it protects the public interest and permits the use of federal property for the development of water power on terms that are acceptable to private corporations and individuals.

State Ownership

STATE ownership of public utilities or other agencies of production and buying and selling has never become permanently established. Nevertheless, on many occasions and in many States efforts have been made to use the credit of the State to accomplish the building of railroads, a movement that went back to the years before the Civil War. In other instances, the credit of the State was loaned to private individuals to encourage the building, by them, of railroads. The general result of these ventures was failure, and, where the properties could not be leased to private operators, they were sold at large financial loss. All of this activity piled up debts and destroyed the credit of the States until some, over-burdened with obligations, resorted to repudiation.

This orgy of spending State funds and pledging State credit for railroads had its reaction in the writing of new constitutions or the amendment of old ones in almost every State in the Union, certain New England States excepted. A check was provided which thereafter prevented legislators from squandering the public funds on widely conceived schemes and from the creation of debt in the absence of specific constitutional authority. Most State constitutions, like the Federal Constitution, today provide that no debt shall be incurred by the State except to pay existing debts, to suppress insurrection and to repel invasion or defend the State in time of war. In a word, the State's credit and money are to be spent solely and only for the purposes of government.

The State of New York persists in operating the Erie Canal system at a huge annual loss, but this business failure did not deter the State of South Dakota from going into a number of commercial enterprises which failed. Despite the unfortunate experience of these and other States, the State of North Dakota undertook to carry on the flour milling and grain elevator business, and other less spectacular but equally speculative undertakings, with disastrous results.

Port development has taken place under State ownership, and there seem to be special reasons which justify the entrance of a State or city into this field. California with its Port of San Francisco, and Louisiana with its Port of New Orleans, are cases in point.

Most of the recent agitation for State ownership relates to water power. This question in various forms has been defeated year after year in New York, Maine, Idaho, Georgia and Michigan. An effort to write the State ownership of water powers into a new State constitution for Nebraska failed. In California three attempts were made to obtain the approval of the voters to the so-called Water and Power Act, by which it was proposed to take over the electric utilities, but each attempt met a decisive veto from the people. A similar measure in Oregon was likewise defeated. The disinclination of voters to approve State enterprise in this direction is a powerful deterrent to State ownership of utilities. There has been no public need for States to embark in the public utility business, √ and no good reasons have been developed by proponents to justify adding billions of dollars of tax-free bonds to the billions already issued.

Search does not reveal any evidence from which one could conclude that there is a strong or general desire for States to enter the public utility field, in the water, gas, electric, communication or railroad businesses, in competition with private corporations.

Municipal Ownership

MUNICIPAL ownership of public utilities and other business enterprises has gained a foothold here and there. The 1925 municipal index (last census) of 1481 cities of over 5000 population, shows 2510 public ownership undertakings. These range from water, gas and electric plants and street railways down to garages, comfort stations, steam laundries and ice manufacture, mostly small enterprises.

This extension of the functions of municipal government to the acquisition and operation of business enterprises, particularly electric, gas and street railway utilities, is attracting attention in the United States, and giving some concern to many balanced thinkers who perceive the fallacies and perils which lie in this movement. In England, this extraneous expansion of government is called municipal trading, and the cause is ardently espoused by George Bernard Shaw and his Fabian Society. Like their brothers in England, the propagandists of government ownership in the United States finally selected that field which to them seemed most fertile in which to sow the seeds of their theories. Collectivism has failed as a canon to conjure by, so far as our national and State governments are concerned. Accordingly, the leaders of the movement have directed all their batteries on the municipalities, large and small. It is a curious anomaly that there should be any following whatever of the British practice of municipal trading, which has been financially unsound and a menace to British progress and society.

Municipal Water Works

By far, the predominating municipal activity is the public water supply. Of all the cities and towns of more than 5000 population, 75 per cent own their own water works. A few cities still have privately-owned systems, though it is but a matter of time when these will be taken over by the municipalities. The reason why municipal operation of water works has not failed is that there is no substitute for water and the business is comparatively simple and is noncompetitive. Private enterprise in water distribution has been equally successful, except to the extent that it has been hampered by taxation and political regulation.

Municipal Railways

The measure of success which has

attended municipal ownership of water supply has not been repeated in the ownership and operation of railway systems.

Aside from the classic failure of the City of Cincinnati, with its steam railroad to Chattanooga, municipalities have essayed but little in the steam railroad business.

Municipal ownership of street car lines has not taken on serious proportions, less than 2 per cent of our 1500 odd cities of 5000 population and over having embarked upon such enterprise. Despite the reduction in gross revenue, as a result of the introduction of individually-owned power-driven vehicles, most of the mileage of street railways is still in private hands. Since 1918 the City of Seattle has been carrying a white elephant in the shape of a "municipal railway" which is a serious tax burden to the city, despite a ten-cent fare.

The San Francisco situation is unique in that it is one of the few systems still operating on a five-cent fare, and in competition with privately-owned lines. Should the city take over the private company, it is to be expected that the fare will be raised. At the present time the private company is not receiving a fair return on the value of its properties after paying its taxes, nor is the city, though free from taxes, properly taking care of its depreciation reserves, notwithstanding the fact that in many particulars San Francisco is an ideal street car city.

Municipal Gas Plants

The growth of the gas industry, one of the oldest and strongest of the privately-owned public utilities, has since its birth in 1816 kept step with the national expansion. Of the tremendous production of manufactured gas throughout the country, but 1½ per cent is furnished by municipal plants, and 80 per cent of this 1½ per cent comes from the Omaha, Richmond, Va., and Duluth plants. The private gas companies are firmly entrenched as essential enterprises and are capably managed. As a result of this favorable situation and splendid public relations, the development of municipal ownership of gas service has not been extensive.

The principal Pacific Coast municipal systems are in Arizona and California. In Arizona the municipal works are at Miami, Winslow, Mesa and Tempe, the latter two distributing only. In California there are Ukiah; Palo Alto, with distribution only; and Long Beach and Coalinga, employing natural gas. The sales of gas, natural and artificial, by municipalities in California in 1928 were between 5 and 6 per cent of the California total, and Long Beach made substantially all of these sales.

Municipal Electric Plants

As in the gas business, private ownership dominates the electric field. In 1925 there were 337 municipal plants in our cities of 5000 population and over. Most of them are in small communities with small and less complicated demands, but there are a few large undertakings, which, as the proponents say, "stand out as shining examples of government ownership."

The best available statistics indicate that less than 5 per cent of the total electric production is from municipal plants. Yet with only 5 per cent of the total production, the municipal plants employ about 10 per cent of the fuel used. This situation is not alarming were it not for municipal ownership outbreaks from time to time in the larger communities.

Owing to the lack of economy in the smaller systems, particularly where generation is involved, the unit costs are high. As a rule, the larger and more modern and efficient plants, and particularly the steam-electric plants, are in private hands and serve the larger fields. These have a marked advantage in capacity factor and hence in economy over the smaller municipal plants serving small local areas.

Fifteen years ago there were hundreds of municipally-owned electric plants in the Southeastern States. Today there are but few, by reason of the ability of private companies, with interconnected systems, to offer to the municipalities rates for service that are actually lower than the unit cost of producing and distributing electricity by their municipal plants, which were old and often obsolete. Each year records a lessening number of municipal plants in this section.

The same situation obtains in the Middle West, in Kansas in particular. During the year 1927, eighteen cities in the State of Kansas disposed of their municipal light and power plants and nearly 100 other cities of that State had done likewise during the preceding five years. Not only have the cities been junking their plants wholesale, often before the retirement of the bonds issued to pay for them, but in several instances they have paid substantial bonuses to privately-owned companies to take over their systems and guarantee light and power service. The chief reason for the decline of the municipal light and power industry in Kansas has likewise been more satisfactory service at less cost from private companies.

In Kansas City itself it was recently ascertained that the municipal plant, which had supposedly been operating on a profitable basis, was actually operating at a loss when proper account was taken of depreciation and other items.

The City of Cleveland operates a municipal plant in competition with a private company, and, while the private plant has expanded its business very rapidly, the municipal enterprise has stagnated.

The City of Seattle has an extensive generating, transmitting and distribution system involving hydro-plants on the Skagit and Cedar Rivers. The City of Tacoma has done likewise with hydro-plants on the Nisqually River and at Lake Cushman. Following their examples, Aberdeen some six years ago voted bonds to start the construction of a hydro-electric development on the Wynooche River and to take over a privately-owned steam plant and distribution system. These projects in some way became involved so that it has never seemed wise to the City Council to pursue the matter further, and they will probably never be revived.

Curiously enough, considering the great strides made by the electric industry in California under private control, this State has some municipal ownership in the electric utility business. Its two large cities, Los Angeles and San Francisco, have made heavy capital expenditures related to electric service, although San Francisco has many more engagements and commitments of greater public concern than electricity to meet, which will act to postpone further investments for this service; and Los Angeles has fallen far short of realizing all of its early hopes, since it has no monopoly and generates but a part of its supply.

The smaller communities of Alameda, Palo Alto and Redding, and a number of others, own electric distribution systems, but do no generating, except Palo Alto, which produces a little by means of a Diesel engine plant, but does not expect to enlarge to meet growth.

The public utility companies in California made approximately 88 per cent of the total net kilowatt-hour sales, with municipal plants selling the remaining 12 per cent.

General Economic Considerations

To summarize the present situation, national, State and municipal, it may be said that the movement toward government ownership is practically limited to municipalities and that while the public water supply is most generally community owned, only the smallest electric plants are so owned, if we except a few large cities such as Seattle, Tacoma, Los Angeles, Kansas City and Cleveland.

As has been said, certain kinds of undertakings have engaged the attention of government since times immemorial, but the social, ethical, political and economic conditions which prevailed in the past were vastly different from those today, which are such as do not justify the extension of government. To the contrary, we feel that the conditions in these respects and the things which have been favorable to our welfare, justify a minimum of government participation.

As this analysis proceeds, certain elements are seen to be outstanding in their bearing upon the question of municipal ownership, among which are the broad economic considerations, such as public wealth, corporations, public utility monopoly, and factors which influence service charges, including taxes and profit. These may perhaps best be discussed in regular order.

Public Wealth

The production of wealth in the United States has increased more rapidly than the population, and no country excels it in material prosperity. A reason often advanced for this increase and preeminence is the use by the American people of power-driven machinery. While it is true that mechanical power has replaced human labor in large degree during the last fifty years, we cannot overlook the essentially fundamental part played by the corporate institutions which characterize our national economic life and have done so much toward enhancing the public wealth. The established order, methods and customs of this country encourage private initiative, guarantee the individual the possession of the fruits of his endeavor, and hold inviolate the sanctity of private property. Private ownership, with its skillful management, is the basic cause of this prosperity.

Hadley defines "public wealth" as the total of private wealth and government property. It is inconceivable that the enormous accumulation of public wealth which exists in this country could have resulted under other than a capitalistic system. The capital which has been recruited periodically from our private wealth to develop instruments of production, despite waste at times through division and dissipation and by injudicious application, has created additional private wealth; but through the agency of mass production and by reason of the efficiency of private endeavor in the hope of private profit, society has not had to pay more for commodities supplied and services rendered, through the agency of private property, than it would have paid in the long run had they been supplied and rendered by public property. In other words, that portion of our public wealth which has been privately managed to render service to the public has produced a surplus which would not have been realized had government managed it for the same purpose.

Corporations

Today, costs are kept to a minimum through mass production, and this has been possible only through corporate organization. The individual, working single-handed, cannot produce the volume of material or give the service required by modern industry and society. It must be remembered that the second half of the nineteenth century was signalized by a stupendous development of industry in which the forces of production and distribution were revolutionized. Society and its industrial enterprises demanded utility services at so accelerated a rate that vast combinations of capital had to be employed to create the hugh utility systems necessary to satisfy these demands. Capitalistic production created the large private utility corporations which we now have under regulation by the State.

Perhaps it is because these utilities are corporations, rather than individuals, and because they are gigantic in capital scope, that the group to which we refer is disturbed. Nevertheless, by virtue of its charter, such a corporation possesses what might be termed a personality and has certain rights and privileges in exchange for which it has assumed certain statutory burdens and accepted certain regulations. It is admirably designed to satisfy the requirements of a vigorous modern American commercial and industrial society, the keystone of which is personal freedom.

Public Utility Monopoly

Economists define public utilities as natural monopolies of organization, being those businesses, not regulated by competition, whose expenses of production show a steady tendency to fall as the size of the business grows.* Among such businesses competition can have but one result, combination; and monopoly once established can maintain itself indefinitely because it can conduct its large scale operations more cheaply, and therefore sell more cheaply, than any small scale competitors that may be tempted into the field.

With this definition of public utility monopoly before us, and considering that the essence of any kind of monopoly is such control over the supply of a commodity or service as will enable the monopolist to regulate the prices thereof, is it in the public interest to have these kinds of natural monopolies in private hands, even though the alternative were public ownership with its well known drawbacks? Were it not for two prime circumstances which have combined to safeguard the user of these utilities, the answer to the question would have to be in the negative.

Ring out Tuberculosis
Ring in health

HEALTH
GREETINGS
1929

BUY
CHRISTMAS SEALS

The National, State, and Local Tuberculosis Associations of the United States

These circumstances are:

First: That despite the upward trend of commodity prices and wages for many years, the public utilities, in the belief that the interests of both consumer and utility are best served by the lowest possible rates, have never advanced their rates proportionately, and in most cases have lowered them.

Second: State regulation in most of the States has taken from the monopolists in these particular cases the power which they would have had in greater or lesser degree, to compel the public to pay for those services higher prices than would be needed to cover the expenses of production and the wages of capital and management.

In view of these two circumstances which both work in the public interest, and each of which by itself would justify private ownership, we may say that private ownership and control is in the public interest, in spite of the tendency toward natural monopoly. Regulation, of course, would prevent rates from becoming excessive, even though increasing costs required higher rates.

Note: The second and concluding installment of this article will appear in the next issue.

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*Includes all utility business except telephone, which is not subject to law of decreasing expense, but with it competition is the exception rather than the rule.

Routine Distribution of N. E. L. A. Committee Reports

and How Additional Copies May Be Obtained

By A. Jackson Marshall

IN a previous article dealing with N. E. L. A. Committee Reports (N. E. L. A. Bulletin, November, 1929, page 722-724) it was explained that because past experience has proved the futility of attempting to keep an accurate report mailing list of individual names, reports when published are mailed to member companies with a sticker directing the report to the company's chief executive officer, in the cases of Special, General and Public Relations committees. Other reports are directed to the company's Accounting, Engineering or Commercial chief executive concerned. The colors of the stickers used are blue for Accounting; pink, Engineering; red, Commercial; yellow, Public Relations; green, Special and General committees.

This mailing to member companies accounts for a large majority of the 3000 to 3300 copies used in the routine distribution of each report by Headquarters.

Copies of each report also are sent to geographic division and state association officers, and to the following: Public Utility Information committee directors, State Public Service Commission secretaries, trade and technical press, and upon request to public and college libraries, and engineering and business schools.

In order to keep geographic division committees informed of the work of the corresponding National committees, sufficient copies of each National committee report are sent to each divisional secretary, for distribution through their offices to members of corresponding geographic division committees.

In addition to the above general distribution, National committee reports are sent to officers of the N. E. L. A., and to executives of the National section concerned. Two copies of each report are sent each member of the committee responsible for its preparation. All reports have similar distribution. An example of distribution is shown in Table I. (Third column.)

Many member companies require additional copies of National committee reports to supply those or their personnel concerned with the various subjects covered by the reports. To fulfill such requirements promptly, standing orders are placed at N. E. L. A. Headquarters for committee reports so that a member company desiring a certain number of additional copies of each report, or reports of only certain committees, receives automatically upon the publication of such reports the quantity desired as specified on the standing orders. To facilitate the placing of the standing order by a member company for such reports as may be desired, separate standing order blanks have been designed for reports of Accounting, Commercial, Engineering and Public Relations National Section committees. A standing order form for an Engineering Section committee report is reproduced in Fig. 1. (Next page.)

Mr. Marshall is Secretary of the Association. This article, the second of a series on N. E. L. A. Committee reports, explains the routine distribution of reports; also how companies may obtain quantities for distribution to their personnel and how individuals may obtain single copies.

It will be noted that the order blank not only lists the various committees of the Section, but also Special and General committees whose activities are related to the Engineering National Section committees. Thus a company desiring copies of reports of the Hydraulic Power Committee of the Engineering National Section would, no doubt, desire reports of the Water Power Development Committee, the order for which could be indicated on this same form. A similar listing of related committees appears on the standing order forms for reports of other Sections.

Whenever quantities of reports are ordered by a company for distribution to its personnel, they are sent to one person, whose name is to be indicated in the space provided on the order blank, for distribution within the company. Standing orders also are placed by individuals, and in such cases the reports are mailed direct to them. Duplicate standing order blanks for the company's file accompanies the original.

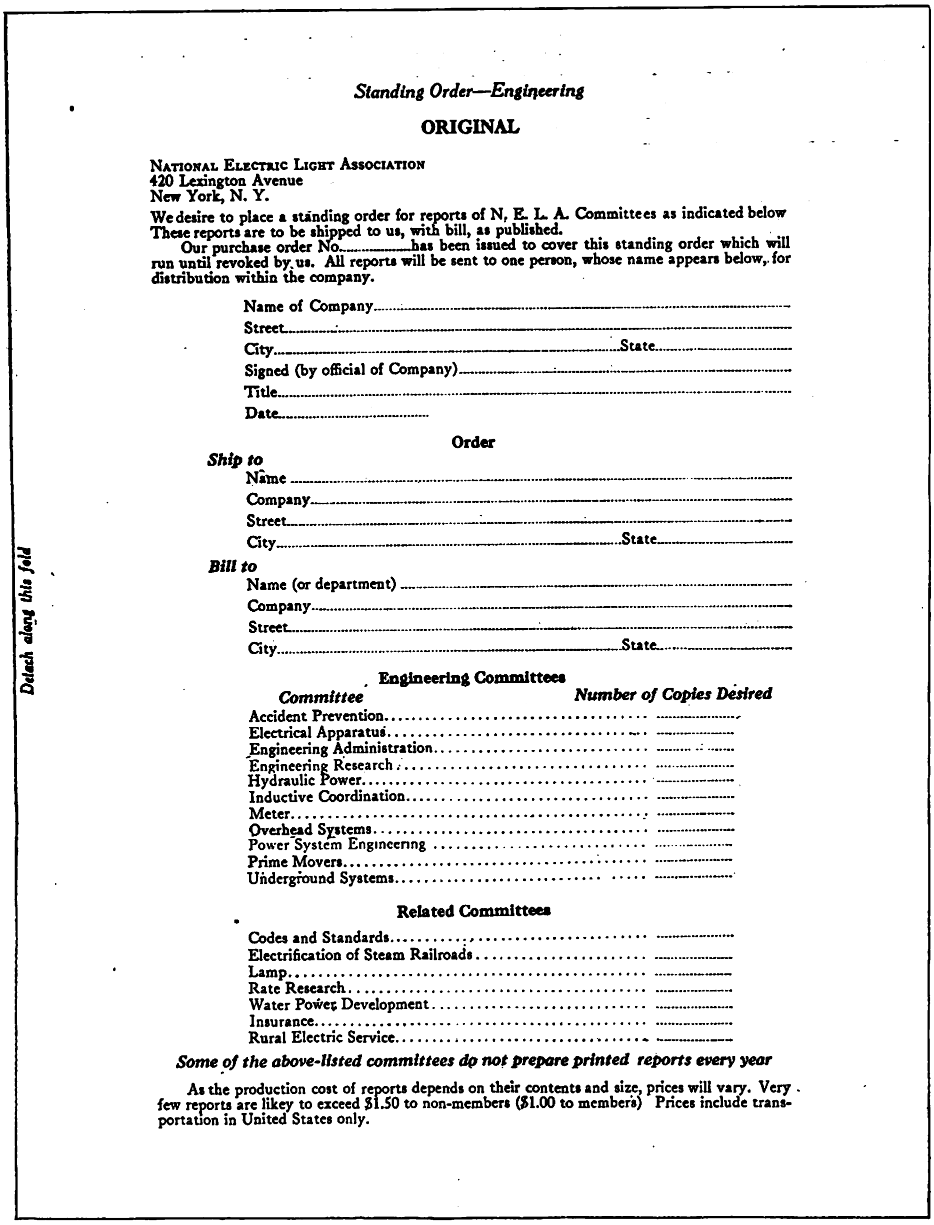
Although the standing order procedure has been but recently developed, approximately 700 companies and individuals have standing orders for National Committee reports on file at N. E. L. A. Headquarters. These vary from orders for one report to orders for two copies of all reports published.

Table I

Distribution of an Engineering Committee Report

(Prime Movers Committee)

	No. of Copies
NELA Officers	5
Executive Committee — Engineering National Section	35
Prime Movers Committee—Engineering National Section	110
Class A Companies	714
Class A Companies Division Offices	614
Class A Companies Additional Executives	195
Class D Companies (Manufacturer Companies)	415
Class F Companies (Associate Companies)	444
Class H Companies (Foreign Members)	141
Geographic Division Presidents	12
Geographic Division Secretaries	12
Special Mailing to Geographic Representatives for Divisional Distribution	180
State Association Presidents	22
State Association Secretaries	23
Trade Press (domestic)	25
Trade Press (foreign)	24
Public Libraries	52
College Libraries	42
Engineering Schools	91
Public Utility Information Committee Directors	25
State Public Service Commission Secretaries	52
Grand Total	3233



Standing Order—Engineering

ORIGINAL

National Electric Light Association
420 Lexington Avenue
New York, N. Y.

We desire to place a standing order for reports of N. E. L. A. Committees as indicated below These reports are to be shipped to us, with bill, as published.

Our purchase order No..............has been issued to cover this standing order which will run until revoked by us. All reports will be sent to one person, whose name appears below, for distribution within the company.

Name of Company..........
Street..........
City..........State..........
Signed (by official of Company)..........
Title..........
Date..........

Order

Ship to
Name..........
Company..........
Street..........
City..........State..........

Bill to
Name (or department)..........
Company..........
Street..........
City..........State..........

Detach along this fold

Engineering Committees

Committee	*Number of Copies Desired*
Accident Prevention	
Electrical Apparatus	
Engineering Administration	
Engineering Research	
Hydraulic Power	
Inductive Coordination	
Meter	
Overhead Systems	
Power System Engineering	
Prime Movers	
Underground Systems	

Related Committees

Codes and Standards	
Electrification of Steam Railroads	
Lamp	
Rate Research	
Water Power Development	
Insurance	
Rural Electric Service	

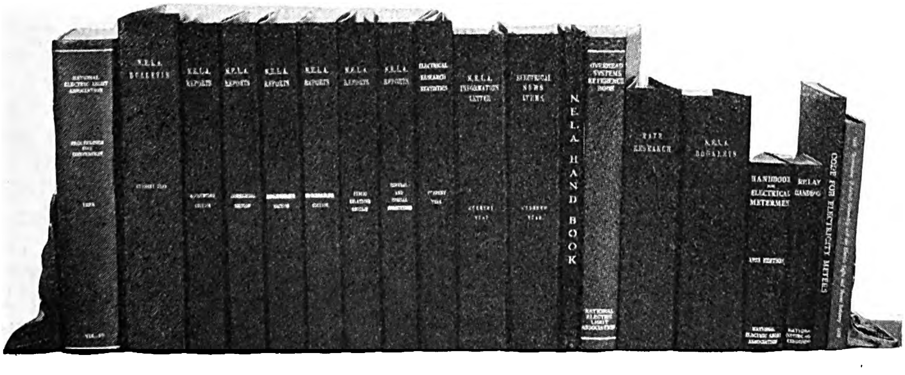
Some of the above-listed committees do not prepare printed reports every year

As the production cost of reports depends on their contents and size, prices will vary. Very few reports are likey to exceed $1.50 to non-members ($1.00 to members) Prices include transportation in United States only.

Fig. 1

Typical standing order form for N. E. L. A. Committee Reports

In each issue of the N. E. L. A. BULLETIN reports published since the preceding issue of the BULLETIN are reviewed as shown on page 820 of this issue. Also on the inside back cover of each issue of the BULLETIN is shown a partial list of current reports available. Standing order blanks and complete list of all reports available will be gladly sent upon request.



The N. E. L. A. Three Foot Book Shelf

SURGES AND FLASHOVERS

By Fred W. Herbert
Director, Accounting Section,
N. E. L. A.

Ask yourself sometime if you are a fit companion for yourself.

* * *

We see so much written on electricity. Could this be classed as light literature?

* * *

They used to say "beauty was only skin deep." Most of it nowadays lies on the surface—and lies and lies.

* * *

Marrying a reigning belle sometimes leads to a stormy existence.

* * *

They are all striving for an education; the college girl gets hers by degrees and the chorus girl gets hers by stages.

* * *

Many a man's opinion of himself is too big for him to get away with it.

* * *

The absent minded professor looked in what he supposed was a mirror and finding no reflection he concluded he was not there and that he must have gone to school, consequently he did not show up for classes that day.

* * *

Women ought to be the best story tellers because they can make up as they go along.

* * *

Buns used to come from bakeries; now you can get them in speakeasies.

* * *

A bachelor says that matrimony is a sort of training school where they teach women the art of drawing alimony.

* * *

There is no limit to the good a man can do if he doesn't care who gets the credit.

* * *

There is always a warm welcome for cold cash.

* * *

A kid never has a good time at a Christmas Sunday School party unless he requires the services of a doctor shortly after.

* * *

"Maintain your rank; vulgarity despise,
To swear is neither brave, polite or wise."

* * *

When a young man is desperately in love he can't distinguish between a peach and a lemon.

* * *

It is a waste of energy to tell a hair-raising story to a bald headed man.

* * *

Author's note—You don't have to have a talent to make a living by writing a column; all you need is a steady income from some other source.

Woman's Opportunity in the Electrical Industry

By ALICE M. BAKER

MINE is no longer "the voice of one crying in the wilderness," for actual experience during the past year has shown the work of the Women's Committee to have gained the attention of an increasing number of executives. These leaders of our great electrical industry have given their sanction to the continuance of our educational program. In maintaining that the work of the Women's Committee is largely educational, we can agree with Samuel Butler that education has become more than a science; it is a craft, for he said: "Don't learn to do, but learn in doing."

I like to think it is by and through our jobs that we become educated. Education raises people above their surroundings and makes them masters of themselves rather than creatures of circumstances. It is not enough merely to know how to get a living; it is necessary to know how to live. In other words, one wishes to be known for what he "is" as well as for what he "does."

Lena Madsden Phillips, President of the Business and Professional Women's Club, recently said that there exists a man-drawn deadline beyond which women cannot pass in business, politics, the professions or any other competitive pursuit, which almost amounts to a conspiracy to halt the advance of women upon the long-held domain of man in business.

BUT in sanctioning the work of the Women's Committee, I see the opportunity given to women in the utility industry, at least, to prepare themselves if they choose to do so, to take up the responsibilities of business when and if the door of opportunity opens.

I see in such sanctioning of our work the opportunity to become increasingly useful to the industry. Our constant aim is to show the woman employee that she has the opportunity to live her life right in her daily task; that in many instances her opportunity is her present job, only she does not recognize it. The real difference between people is not in their chances, but in their ability to recognize these chances. They come in one form or another to every one. Probably no one ever lived whose hand at some time has not been at the door of genuine opportunity. The trouble is that we do not see it, because it comes to us in some other form than we had determined in our minds that it would come. Opportunity wears the simplest dress. She hides herself behind the simplest disguises, so for the most part we pass her by as a commonplace thing. Opportunity comes in such fashion that our reception of it determines our fitness to use it. Those who succeed are open-minded, alert to discover the true value of things. They take everything at its best and use it for its highest. So there lies at the bottom of every right use of opportunity a noble quality of character—that quality which takes life as a thing full of noble chances of growth and progress. So, women of the utility business, we need not a new chance, but a clear vision to discern the chance which at this very hour is ours for the taking.

Miss Baker is secretary to the president of the Hartford Electric Light Co., Hartford, Conn., and a past chairman of the New England Division Women's Committee. This address was made before a meeting of that Committee at New London, Conn., September 11, 1929

This opportunity for development has come only within very recent years, for it was not many years ago that we heard the expression, "Breaking men while making money." The human race has now developed so that management today says, "We are making men and women while we are making money." Such a thought denotes the march of progress. This age of power—this electrical age has developed a new type of leadership in business and following in the footsteps of that outstanding man of these times, Owen D. Young, business is becoming a profession. At the present, men are bringing to their work an enthusiasm and interest which are not caused or measured entirely by profits. The modern hazard in business is mental, not physical. Business has become intellectual, and calls for the same quality of mind that once made generals and priests. Dr. Johnson had some idea of this when he said, back in the 18th Century, at the sale of a brewery, "Gentlemen, we are not here to sell a parcel of boilers and vats, but the potentialities of growing rich beyond the dreams of avarice." The same thought is in the minds of electrical leaders today who are saying: "Gentlemen, we are not here to sell a block of kilowatt hours, but the elimination of drudgery to a completely electrified country."

RECENTLY Henry Ford expressed it thus: "The use of electricity is yet little to what it will be during the next ten years. We must enlarge our conception of its use so that the power that comes over the wire may be as common as air and universally used. Corralling the sources of power and doling it out is not the way. We must provide power so lavishly that it will become cheaper to use it than not. It is to be done by giving more and more electricity for less and less money, and by teaching how these great quantities can be used profitably and with benefit in every direction. The biggest job before the utilities is to get electricity into the minds of the people. Create a desire for what electricity will do for them. They need only to be shown how tremendously much more electricity can offer them if they will only let it."

We women are arriving on this scene riding on the crest of this wave. What are we going to do with such a situation? First of all, I think we are going to learn the facts about not only our own jobs, but the relation they hold to the work of those associated with us. Unless one is in work of which he feels himself a real part he cannot fully attain happiness. The work we are doing should be recognized as a telescope through which realization of our ambitions may be seen. In order to work willingly, one must work because he desires to work from within, not because he is forced to carry out orders given

(*Continued on page* 794)

James H. McGraw Prize Paper

Operating a Hydro-Electric System for Best Economy

and Means Employed for Checking Performance of Operation

By E. B. STROWGER

IN recent years considerable attention has been given to the economics of both hydro-electric and steam-electric power plant operation. In the case of the steam plant the resource is usually a physical coal pile which represents a large expenditure of money and the conservation of which is very apparent in its relation to profits. In the case of the resource of the hydro plan, the tendency in general has probably been to have a less rigid system of accounting. In the latter case the production of electrical energy per cubic second foot of water varies with the gate-opening of the turbine and also may change in value for a given gate-opening through wear or perhaps pitting or mechanical depreciation of some kind. To maintain the plant so that a maximum of operating efficiency is possible and to operate it in such a manner that a maximum of production is realized, is the only means of making the utmost use of the available resource. This is the object of the engineering and operating departments of the hydro-electric company and justifies careful study, comprehensive tests to determine machine characteristics, and a vigilant check on the actual operation of the plant to make sure that it is operated in conformity with a predetermined schedule of load distribution.

Hydro engineers and operators have focused their thoughts to a great extent upon efficiency and economy in trying to compete with the improvements which have rather lately been made in steam-electric generation. The latter improvements have been made in large measure by increasing the efficiency of the power plant equipment.

Although hydro plants have already attained such high maximum efficiencies that there is considered to be little left in the available range of improvement, it should be remembered that the actual realization of this high rate of generation for a large proportion of the time of operation is quite another consideration. Operation at this most economical point for given system conditions may involve operating a hydro unit at a point considerably beyond the point of maximum efficiency. For instance, later it will be shown that three 70,000-hp. hydro units installed in one station, which is operated in conjunction with two other stations, should be operated at from 8 to 16 per cent beyond their points of maximum efficiency, for the average condition of operation with the water resources available. The three stations referred to are progressive developments at the same site, formerly known as separate stations and now called the Schoellkopf Station of The Niagara Falls Power Company. Reference will be made to the three sections of the Schoellkopf Station as Station 3A, 3B and 3C.

Mr. Strowger's paper won the James H. McGraw first prize award for 1928-1929. The author is assistant Hydraulic Engineer for the Niagara Falls Power Company. He entered the employ of the Niagara Falls Company in 1919 as draftsman and designer. In 1918 he graduated from the University of Rochester with the degree of B.S. in M.E.

An analysis of the economic operation of this plant and a description of the means employed for making reasonably certain of a maximum production for the given resources will serve as an example to emphasize the importance of the above statements.

Benefits from testing and from keeping records of plant discharge

The benefits accruing from a comprehensive testing program and from keeping records of plant discharge, as well as records of the kilowatt output, have been quite generally recognized among members of the industry. Increased attention has been given to this subject in recent years along with the general policy of conservation of resources. The steam plant has had for a considerable time a testing department for measuring resource and disposition thereof.

Description of the Schoellkopf Station

Stations 3A, 3B, and 3C, referred to above, are under one roof and contain units of very different characteristics. A general plan of the three stations is given in Figure 1, as is also a profile of the 3C development. The 21 units installed have ratings as given in Table I.

Station	Average Gross operating Head Ft.	Unit No.	Rating of Turbine h.p.	Rating of Generator kv-a.
3A Exciters	212	3, 8	1,000	1,000
3A—A.C.	212	1, 2, 4, 5, 6, 7, 9, and 10	10,000	8,000
3A—D.C.	212	11, 12, 13 14 and 15	10,000	8,000
3B	217	16, 17, 18	37,500	32,500
3C	217.5	19, 20, 21	70,000	65,000

TABLE I

The average allowable diversion for all units is 20,000 cu. ft. of water per sec., limited by governmental authority and not by available river flow. The operating gross head does not vary far from the value corresponding to mean river stage, as given in Table I.

Load Distribution among Identical Units in a Station

The study of economic load division among units in a hydro station is quite simple in the case of units identical in design. Such a study in the case of a station having different types of units is somewhat more complicated and in the case of load distribution among units of various stations, all of which may have different characteristics, may prove to be somewhat involved, but also may prove to be interesting.

Figure 2 gives the relation between power and discharge for the A. C. section of Station 3A for various numbers of units operating, all units being of the same design. The heavy line indicates the number of units to be run at any given station load for best economy.

tions 3A and 3C are given at the bottom of Figure 3. Above these the average kw. per c.f.s. curves are drawn as are also the two incremental efficiency curves (labelled △ kw./ △ c.f.s.) for units 19 and 21. A part of the kw. per c.f.s. curve and also of the △ kw. per △ c.f.s. curve for Station 3B is given in the enclosed section of the figure. It is evident that the use of water in Station 3A is the least efficient, the kw. equivalent per c.f.s. being about 14.97. The 3C and 3B station should, therefore, assume loads to the point where the incremental use of water falls to 14.97 kw. per c.f.s. before Station 3A is put into operation. If it is necessary for Station 3A to carry a load, then the distribution among the units should be in accordance with Figure 2, the station load being equally divided among the units loaded.

To find out the best distribution of an average available water supply of 20,000 cu. ft. per sec., reference is made to Figure 3. This is a problem of water dispatching. Allowing 10 c.f.s. for waste, 65 c.f.s for excitation of units 3 and 8 and 2558 c.f.s for the firm D. C. power of 3A, a balance of 17,367 c.f.s. is available for the A. C. system. Loading 3B and 3C stations to the point where the incremental use of water begins to equal the best average use through Station 3A requires approximately the following loads:

	Kw.	C.F.S.
Station 3B (3 units)	77,500	4,757
Station 3C		
Units 19 and 20	96,000	5,758
Unit 21	54,000	3,237

These loads are determined by the intersections of the △ kw. per △ c.f.s curves and a horizontal line through 14.97 as indicated by dotted lines. The water resource left available for Station 3A is 3,615 c.f.s., in accordance with Figure 2, should be divided among 7 wheels producing about 54,000 kilowatts. The maximum efficiency points for units 19, 20 and 21 are at loads of 41,000 kw., 41,000 kw. and 50,000 kw. respectively, so that for the average condition of operation these units should assume loads in excess of these values by about 7,000 kw., 7,000 kw. and 4,000 kw. respectively. In the case of units 19 and 20 this means that these units should operate for best economy at points where the overall unit efficiency is about one per cent under the maximum possible value.

Load dispatching which is an ever present problem for the load dispatcher involves the same factors as does water dispatching if economy is a consideration. Table II is a small section of a large table giving for any demanded load the proper distribution of load among the various stations. Table III is a portion of the operating table for loading the units in Station 3B after determining from Table II the total load to be carried in 3B.

Schoellkopf Station
Distribution of Load between Stations
3A, 3B and 3C

Total	Kilowatts Station 3C Unit 21	Units 19 and 20	Station 3B	Station 3A-(A.C.)	Diversion C.F.S.	Increment
310,000	57,000	112,000	81,000	60,000	19,327	72
311,000	57,000	113,000	81,000	60,000	19,399	72
312,000	57,000	114,000	81,000	60,000	19,471	73
313,000	57,000	114,000	82,000	60,000	19,544	73
314,000	57,000	115,000	82,000	60,000	19,617	73
315,000	57,000	116,000	82,000	60,000	19,690	74
316,000	57,000	117,000	82,000	60,000	19,764	74
317,000	57,000	118,000	82,000	60,000	19,838	74
318,000	57,000	118,000	83,000	60,000	19,912	75
319,000	57,000	118,000	84,000	60,000	19,987	75
320,000	57,000	119,000	84,000	60,000	20,062	75

TABLE II

Assuming a load of 315,000 kilowatts is to be generated by the Schoellkopf Station not including the D. C. units, then from Table II the loads to be carried by 3A, 3B and 3C are 60,000 kw., 82,000 kw. and 173,000 kw. respectively. The consumption of water will be 19,690 cu. ft. per second for this load. Station 3B will divide its load equally among three units as would be shown by the completed Table III, 3A in accordance with Fig. 2 will have its load divided equally among eight units and the load of 173,000 kw. taken by 3C will be divided between units 19, 20 and 21 in the order of 58,000, 58,000 and 57,000.

Station 3B
Water Consumption for Various Loads Showing Best Distribution of Load Among Units in Station 3B, Loads to Be Equally Divided Among Units Operating

Kilowatts	C.F.S. 2 units	3 Units	Number of Units for Best Operation
54,000	3,333	3,372	2
54,500	3,369	3,400	2
55,000	3,405	3,426	2
55,500	3,442	3,453	2
56,000	3,478	3,479	2
56,500	3,517	3,506	3
57.000	3,555	3,533	3
57,500	3,593	3,560	3
58,000	3,633	3,586	3
58.500	3,673	3,613	3
59,000	3,716	3,640	3
59,500	3,760	3,667	3
60,000	3,803	3,695	3

TABLE III

Charts and Records of Operating Department

It is quite general practice to take readings of many power house instruments every hour or perhaps every half hour. These readings are recorded in the station log book either in the power house or transmitted by telephone to a central point where a general log book is kept. Records including kilowatt output, water levels, and perhaps gate opening, may to advantage include discharge quantities and thereby prove valuable for the demands of dispatching and in general for cases where both deliberate and instant use are made of them.

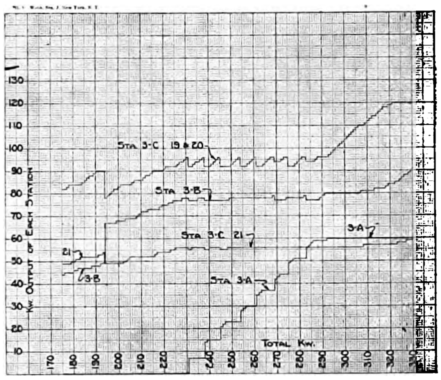


Figure 4
Chart for dispatching load — Schoellkopf Station.

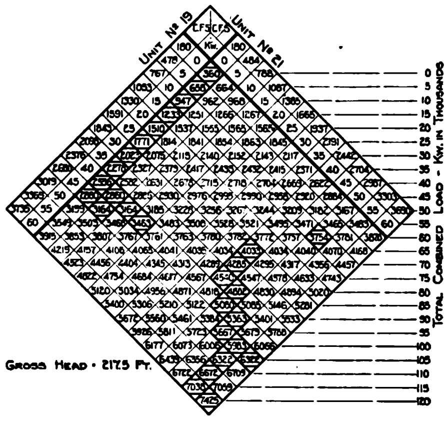


Figure 5
Diagonal chart designed for load dispatching when two units only are involved.

The rating and loading tables for this purpose are used by both the local operator and the dispatcher.

In the case of both Tables II and III it should be noted that the values of operating gross head used are those given in Table I and are for mean river stage. The variation in head from this mean value is relatively small so that the one set of tables is sufficient for all times. However, if the case at hand involved a variation in head which was large in proportion to the total average head then it would be necessary to make a family of curves or a set of tables for as many intervals of head as is desired within the operating range.

Sample charts for load dispatching are given in Fig. 4 and 5. The former gives in graphical form the same information as the completed Table II would give. Fig. 5 is a diagonal chart designed to give proper combinations of load for a two unit station and was made up for a hypothetical station containing two units the same as Units 19 and 21 referred to above. The square in the top diagonal column shows the cubic feet per second of water required by the unit indicated and for the load given in the second diagonal column. The figures in the remaining squares give the discharge in cubic second feet

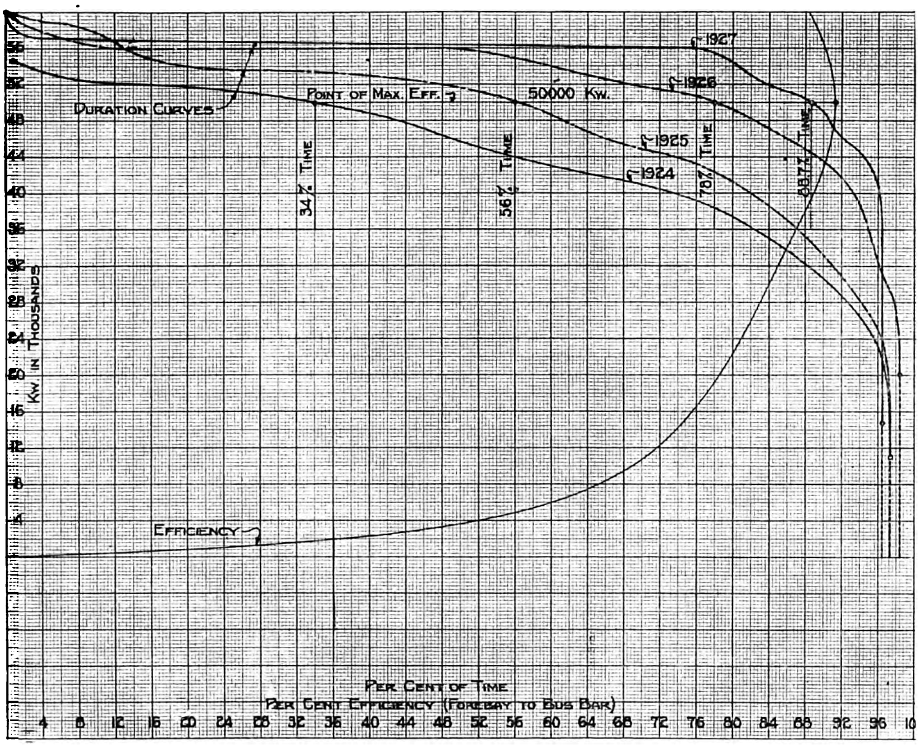


Figure 6
Load duration curves and efficiency curve for Unit 21 of Schoellkopf Station.

required by operating the two units at loads indicated by the respective diagonal coordinates followed to the second diagonal columns and are obtained by adding the figures in the corresponding squares in the first columns. All possible combinations of loads are indicated. The vertical column to the right gives the total combined load in the two units. A horizontal line from any combined load intersects a row of squares giving any possible combination of loads for the given total load. The lowest figures of the squares intersected indicate the best load distribution and the diagonal coordinates then give the corresponding loading for each unit and also the water consumption. For easy use, the squares for the best combinations of load are made prominent.

Other charts of a similar general nature to the ones illustrated may be designed which take account of the characteristics of the units involved and the vagaries of the local system.

Maintaining the Units at High Efficiency

Mention was made of the lowering of the rate of production, or the efficiency, by wear or pitting or by any mechanical depreciation of the turbine. A progressive schedule of inspection and overhauling, based upon experience with the individual types of wheels, will limit this depreciation. In the case of 3A Station where the turbines have horizontal settings, each unit is thoroughly repaired at least once in two years, and in the case of 3B and 3C one overhauling in five years is all that is necessary to maintain the wheels in their original condition, as has been determined by frequent tests. Periodical tests determine the effect of wear and pitting upon the efficiency of the unit and are prerequisite for an economical schedule of repair as well as one of load distribution.

Disposition of Resource

One method of checking the actual economy of operation of the plant is to analyze periodically the resources and the disposition thereof by means of an operating balance sheet. This method is described by G. R. Shepard in an article entitled 'The Balance Sheet' Idea Applied to Power Plant Operation" (N. E. L. A. publication No. 278-34). It accounts for all of the potential energy in the power site, giving the value of energy in dollars, and rigidly accounts for all losses since the total of the losses and the energy produced must equal the total resource. One of the detailed losses to be considered is the loss due to "operation," which includes unavoidable or careless operation and also inability due to local conditions to operate in accordance with the preferred loading schedule. Monthly balance sheets, summarizing and allocating the daily losses and their evaluation and also summarizing the production of energy, are made. These monthly balance sheets are mutually comparable and may be related to the predetermined ideal balance sheet of operation. In this manner the analysis shows how closely the operation of the stations approached the ideal.

Application of a Duration Curve to Power Plant Operation

A second and very useful check on the actual operation of the plant may be obtained by means of a duration curve of operation. A sample curve is given in Figure 6, which shows for Unit 21 of Station 3C the duration of time the unit was operated at, or above, a given load, for the years 1924, 1925, 1926 and 1927. Year 1924 was the first year of operation and since that time it is apparent that the unit has been operating at a greater per cent of time at the most efficient range of loads, the most efficient range being located at, or near, the higher loads as indicated by the relation between overall efficiency and output given on the same figure. In other words the actual operation of the unit has been approaching the ideal as determined from economic considerations.

To make the use of the curve more clear, an explanation might be of further use. Opposite each load is plotted the per cent of time the unit has operated at this load, or at a greater load. Therefore, to obtain the time that the unit has been operating between two given loads the difference between the values of per cent of time opposite each of these loads would give the desired result. For instance, for the year 1927 the unit operated at, or above, a load of 50,000 kw. 88 per cent of the time. It operated at, or above, a load of 58,000 kw. one per cent of the time. The unit, therefore, operated 87 per cent of the time during the year 1927, between this load range of 8,000 kw., throughout which the efficiency is between 89 per cent and 91 per cent. By reference to Figure 3 it is evident that this range is located within limits of eight per cent on either side of the point of maximum economy for a flow of 20,000 c.f.s., which is the average resource available.

$2,000 Award for Industrial Advertising Campaign

THE Harvard Advertising Awards Committee of the National Industrial Advertisers' Association has announced the annual Bok Award of $2,000 for the best industrial advertising campaign for 1929 appearing in newspapers and periodicals.

Closing date of this competition is Dec. 31, 1929. Industrial advertisers will find that a consideration of the requirements alone will tend to inspire higher standards in industrial advertising.

The details of participation can be secured direct from Harvard Graduate School of Business Administration, Soldiers' Field Station, Boston, or from A. H. Oberndorfer, chairman N.I.A.A. awards committee, Sivyer Steel Casting Company, Milwaukee, Wis.

The Domestic Load and Some of Its Problems from the Utility Standpoint

By H. C. Rice

YOU will find the text for my address in the twenty-second chapter of Exodus—the twenty-first verse: "Thou shalt neither vex a stranger, nor oppress him." These words were spoken to the children of Israel after they had escaped from Egypt and were about to enter the promised land. At this time there was being formulated that elaborate code which ever since has been known as the Mosiac Law. Many centuries have elapsed since that time, yet most of the laws of Moses are still recognized as being sound and worthy of our observation. At the same time, many of these laws which no doubt were excellent and even necessary when written, have since become obsolete.

We, who by virtue of our technical knowledge, are sometimes consulted in the preparation of codes and ordinances should bear in mind this admonition, *Thou shalt neither vex a stranger, nor oppress him.* Laws such as the Electric Code are not necessary for the protection of the technically trained man. He knows what he can do with safety, and what should be avoided. The laws are designed by trained men for the protection and benefit of the uninitiated. They should not include unnecessary measures which will vex and oppress the citizen affected.

IN the forty years that have elapsed since 1890 the changes that have taken place in the electrical industry are more pronounced than the sociological changes that have transpired since the time of Moses. While we are smiling at an ancient law which prohibited the use of pork as a food, would it not be well to examine some of our electrical codes and ordinances to determine if they, too, do not contain features that are no longer essential? Should not our efforts be directed toward the simplification of existing codes, rather than adding new and oppressive features to them?

The electrical industry is a vast organism, composed of innumerable elements, each of which is dependent on some of the others for its existence and welfare. As the industry prospers, so will those engaged in it, progress. As the manufacturer produces better appliances at lower costs, the power company's market broadens and the consumer profits. As the power company's lines are extended, more and more customers are uncovered where the electrical contractor can be employed. Through it all runs the factor of public safety, meeting the manufacturer in the underwriter's laboratory and the Bureau of Standards, meeting the Power Company through the Railroad Commission and the Accident Commission, and meeting the contractor and the public largely through the various inspection bureaus. Each of these should work in cooperation with the others, but at the same time, remembering that their purpose is to serve, and not to oppress, mankind.

Mr. Rice is Manager of the Merchandise Department of the Southern California Edison Company, Los Angeles. This address was delivered before the California Electrical Inspectors Association, at San Francisco.

Those contractors who think that they can increase their volume of business by making electrical installations more difficult and expensive are nearsighted. The inevitable function of a funnel is to restrict the flow of whatever is trying to pass through it, whether it be water or money. By the observation of changes in female attire within the past fifteen years, we may well be convinced that human life can get along very well with what appears to be a minimum of protection.

Gasoline is fully as dangerous as electricity. What would have been the effect on the sale of automobiles if they had been surrounded and encumbered with protective devices similar to those sometimes demanded in connection with the installation of an electric range? Why should we insist on a factor of safety all out of proportion to the risk involved?

The fact that you have invited me, as a representative of the power companies in California, to speak at this meeting is evidence of your sincere desire to co-operate with other branches of the industry in a common effort to give the ultimate consumer a reliable and economical service. I also see in this invitation an implied request for the power companies' point of view, and with this assurance of your good will I shall make some rather frank statements knowing that you will accept them in the spirit in which they are offered.

In the ordinary course of events, the inspector comes in contact with the consumers only at the time the new building is being constructed, or when a remodeling job of sufficient scope to require an official permit is being done. On the other hand, the representative of the power company frequently visits the consumer's property and some of the things that develop from these visits are surprising. For example, a complaint of dim light, meaning low voltage, will lead to an investigation showing that the customer's meager wiring is seriously overloaded. Again, the troubleman will be called out by a customer who merely says, "My lights will not burn." He finds a fuse blown out, also by an overload.

THE customer may be convinced that a change in his electric wiring should be made, but he is reluctant to do this as he is afraid of the cost. May I now ask you this pointed question, "If we increase the cost of electric wiring by requiring excessive protective devices and expensive material, which in turn demand a high labor cost for their installation, is there not a possibility that the consumer, to escape this expense, will resort to schemes and devices which increase his electrical hazard? Is not the object of safety defeated, rather than aided, by a system which makes it difficult for the customer to use the desired appliances in a safe, sane and inexpensive manner?"

Some cities have raised their standard of wiring so high that the high price tends to keep down the adequate number of outlets, resulting in the hazardous condition of running cords under rugs and having the customer install his own outlets in an unsafe manner.

Those enterprises whose product or service competes with electricity will always be found heartily endorsing any proposal which will make electrical appliances more difficult to install or more expensive to use. May I again suggest that the function of your group is in the interest of the user. Through the payment of a fee, which comes from his pocketbood although actually paid by a contractor, the prospective user of electricity engages your expert service and advice. Although he may not definitely say so, his application for a permit implies that he wants to know what electrical equipment he should have at a minimum cost which will assure adequate, reliable and safe service. He would not be happy if he thought that some of your rules had been inspired by selfish outside interests in no way connected with his particular situation.

You have heard the story of the man who was being pressed for a debt of $300.00. He stalled along for several months and finally, being unable to give further excuses, he signed a note in favor of the creditor. Then he heaved a great sigh of relief as he said, "Thank Heaven, that's paid." It seems to me that, in much the same fashion, those who prepare electrical ordinances have been inspired by a similar theory. When a new condition develops to the point where it becomes acute, some group gets together and devises a new rule. Then they have it endorsed by the proper legislative body following which they say, "Thank Heaven, that's fixed."

Men who are closely in touch with public opinion, such as politicians and editors, know that nothing permanent can be accomplished where the public is involved until that public comprehends the problem and shows a desire to co-operate. From your long experience in meeting home builders, I am sure you realize that the public welcomes your service insofar as it represents a protective feature, but that they resent anything which may give them the impression that you are doing something which will increase the cost of their home without giving them any visible benefit. If the home builder does not have confidence in your department, he is going to try to avoid an inspection at some later date when he may be doing some remodeling and, to this extent, the main object of your existence has been defeated. At the same time, the reputation of the entire electrical industry has been somewhat tarnished. The consumer will soon be receiving a low voltage service for which he blames the power company, and also having a poor opinion of the manufacturer who produced the device which is not giving him good results.

THIS leads to the next point I want to emphasize. As I see it, there is only one time when you may feel positive that the electrical installation in a new home, apartment or store is completely under your control and that is when the new building is erected. After it is connected to the power company's lines, there are innumerable ways whereby the service can be extended without your official knowledge. If you agree with me, is it not the part of wisdom to urge the owner to anticipate his electrical requirements for several years to come and provide for them in the original installation? We know that such a course will be more economical for him and further that it will be subject to adequate supervision.

I am firmly convinced that the entire electrical industry would benefit and the consumer would be better served if the inspector working out of your offices might be trained to quiz the consumer along these lines at the time of his first contact with the job. What would happen if he would ask half a dozen questions? "Don't you think it would be a good idea to put lights in these closets? You know many fires are started by people hunting for things with matches."—"Don't you think you should have some more convenient outlets? Where are you going to connect your radio — vacuum cleaner — table lamps — toaster — percolator — heating pad—bedside lamp—sewing machine—your boy's electric train—your curling iron?"—"Why don't you provide the wiring for an electric range? You may not want one now, but the chances are you will within the next five years."—"Some day you are going to have an electric ironer. Why don't you provide an outlet for it at this time?"—"I think it would be a good scheme for you to provide a three wire No. 6 service. It won't cost much now and it will be a great help to you in the future."

I am not suggesting that you turn your inspectors into salesmen and I do not believe the customer would so consider you. But I do believe that we would have better wiring installations and that your department would have better control over them if something of this sort might be put into practice.

In a little city near Los Angeles, the inspection department has developed this idea to the point where they ask the prospective builder, "Why don't you make a 'Red Seal' installation and assure yourself the full benefits of electric service?" It is surprising how many welcome the idea and change their plans accordingly. Coming as it does from a party who has no commercial interest, this suggestion is always received as friendly advice.

Another feature which has been somewhat annoying to the power companies, is the lack of uniformity of electrical ordinances. One of my friends has this to say, "Electricity obeys the same laws, irrespective of municipal boundary lines and it certainly would be of great benefit if the ordinances were standardized, especially in California where the same utility serves hundreds of cities and towns." We hope that the good work already done by way of preparing a uniform ordinance will be continued, and I am sure I may speak for the entire group of power companies in the state in offering you the use of their records and the services of their men, if such will be of any assistance to you.

The constant tendency of manufacturers is to give greater value to the ultimate consumer, either directly by reducing the price or by furnishing an improved appliance without increasing the price. The Utilities also have consistently lowered the cost of electricity. However, when we come to the point of installing an electrical distribution system in the consumer's house or store, the tendency has been to increase the safety factor and with it the cost to the customer—in some isolated instances, these increased costs amounting to several hundred per cent.

The power companies of California supply approximately 1,000,000 residences. My own company takes care of 350,000 of this number. Three years ago the average annual consumption per meter was 365 kilowatt-hours or one kilowatt-hour daily. On August 1 of this year, this average annual consumption had reached 614 kilowatt-hours. The figures I am using are averages for the entire system. Naturally this means that some districts are higher and others are lower than the indicated figures.

To me, it is highly significant that the districts reporting the lowest figures are the ones where wiring requirements are most rigid. I can cite you an instance where four switches are demanded between the company's pole and an electric range. That house has electrical protection all out of proportion to the hazards of bacteria and bacilli that assail its kitchen from every approach. And if, by chance, one of the numerous fuses should blow, a real hazard is faced by the person who attempts to locate it.

(*Continued on page 794*)

Behind the Veil

Electricity and Communications: Part I. The Electric Telegraph

By ERNEST GREENWOOD

The ninth of a series of articles portraying against a social-historic background the evolution of the electrical industry and the chief personalities that have been instrumental in its growth.

WHEN we speak of "Communications" today we instantly think of the United States Mail Service, the telephone, the telegraph, the radio, wireless, airplanes and what-not. Narrowing the phrase down to "rapid communication," our thoughts turn to Samuel Morse as though he were the first to think of the idea and as though he were the inventor of practically instant communication between points separated by great distances. Very few of us realize that the idea of "rapid communication" and the search for means by which it might be accomplished is almost as old as civilization itself—that it dates back to a time when the only manifestation of electricity known to man was lightning and when even the magnetic properties of the lodestone were unknown.

Yet, if we are to believe Aeschylus, the father of Athenian drama, Agamemnon, in 1084, B.C., employed a line of optical signals to advise his queen, Clytemnestra, of the fall of Troy. Robert Browning's translation, London, 1877, runs as follows:

> "Troia, the Achioi hold . . .
> Hephaistos — sending a bright blaze from Ide
> Beacon did beacon send, from fire the poster,
> Hitherward: Ide to the rock Hermaian
> Of Lemnos: and a third great torch o' the island
> Zeus' seat received in turn, the Athoan summit.
> And—so upsoaring as to stride sea over,
> The strong lamp-voyager, and all for joyance—
> Did the gold glorious splendor, any sun like,
> Pass on. . . ."

Ann Swanwick gives us another version of Aeschylus' "Agamemnon" as follows:

> "For Priam's city have the Ariges Won.
>
> . . . .
>
> Hephaistos sending forth Idaian fire.
> Hither through swift relays of courier flame . . ."

Mottelay tells us that on page 193 of his "Agamemnon," E. H. Plumtre refers to the system of posts, or messengers, which the Persian kings seem to have been the first to organize, and which impressed the minds of both the Hebrews and the Greeks by their regular transmission of the king's edicts, or of special news. It is also interesting to note that Homer, the great epic poet, relates that the lodestone was used by the Greeks to direct navigation at the time of the siege of Troy.

So much for Agamemnon.

It seems to have remained for that celebrated patriarch, Job, whose chief asset, patience, would find but little market in America to day, to go down in history as the first to suggest the electric telegraph. We find him saying in Job XXXVIII, 35: "canst thou send lightnings, that they may go and say unto thee, 'here we are'? (Behold us)."

SAMUEL F. B. MORSE

(A later portrait than the one used on the cover)

Moffet, in his new translation of the Bible, gives a version that is even more explicit:

> "Can you send out the lightning on its mission?
> Does it say humbly to you,
> Here am I?"

There is also a story in "Pre-Adamite Man," in which the author, P. B. Randolph, quotes an instance, seemingly uncertain as to whether it comes from Mcrinus or some other writer. He found good evidence, he says, during his stay in Egypt, that one of the Cleopatras actually sent news by a wire to all the cities from Heliopolis to the Island of Elaphantine.

The earliest *reliable* record of messages transmitted by the *sign of fire* is to be found in the book of Jeremiah, the date of which is placed by Mottelay as 588, B. C.:—"O ye children of Benjamin, gather yourselves to flee out of the midst of Jerusalem, and blow the trumpet in Tekoah, and set up a sign of fire in Beth-haccerem; for evil appeareth out of the North, and great destruction." Again we find that Moffet's new translation of the Bible is more explicit, for it puts it in this way:

> "Fly for safety, men of Benjamin,
> fly from Jerusalem
> blow the trumpet in Tekoah,
> light a beacon on Beth-hakkherem;
> for trouble is looming out the North,
> ay, fell disaster."

Coming back once more to the earliest references to "communication by wire," we must jump forward two or more thousand years to 1667, when Dr. Robert Hooke, who became secretary of the Royal Society, alludes to the possibility of telephony. He says: "And as glasses have highly promoted our seeing, so it is not improbable that there may be found many mechanical inventions to improve our other senses—of hearing, smelling, tasting, touching . . . 'tis not impossible to hear a whisper a furlong's distance, it having been already done; and perhaps the nature of the thing would not make it more impossible though the furlong be ten times multiplied. And though some famous authors have affirmed it impossible to hear through the thinnest plates of Muscovy glass, I know a way by which it is easy to hear one speak through a wall a yard thick. It has not been examined how far acoustics may be improved, nor what other ways there may be of quickening our hearing, or conveying sound through other bodies than air, for that is not the only medium. I can assure the reader that I have, by the help of a distended wire, propagated the sound to a very considerable distance in an instant, with seemingly as quick a motion as that of light, at least, incomparably swifter than that which at the same time was propagated through the air; and this not only in a straight line, or direct, but one bended in many angles."

Considering the fact that this statement was made at least 180 years before Alexander Graham Bell was born, it must, at least, be considered as remarkable. Science was to wait one hundred and twenty-nine years for the invention of the Voltaic Pile by Allesandro Volta. We can only classify Hooke's comments with Da Vinci's belief in the possibility of flying machines, or Roger Bacon's prediction of chariots which would move with incredible speed under their own power. What Hooke may have been dreaming of, what he had seen, what experiments he had made which persuaded him to make such a statement, probably no one knows. Nevertheless, it can be accepted as the first suggestion of the telephone, even though had the telephone of the present day been suggested to him he probably would have ridiculed it.

But Hooke seems to have abandoned this idea of instant communication "through a wall a yard thick" and the possibility of hearing "a whisper a furlong's distance," for we find him, ten years later, setting forth a plan of "telegraphic transmission" in a paper addressed to the Royal Society, which is nothing more or less than a system of signaling by semaphores. In this paper he shows a way "how to communicate one's mind at great distances . . . 40, 100, 120, etc., miles . . . in as short a time, almost, as a man could write what he would have sent." His apparatus consisted of an elevated framework supporting an open screen, behind which were suspended as many wooden devices, or symbols, such as circles, squares, triangles, etc., as there were letters in the alphabet. In the day time, these devices were drawn up by a rope behind the screen and made visible in the open space, while during the night use was made of torches, lanterns, or other lights.

Again we must jump a hundred years to 1773 in our search for references to electrical communication, when we find, as mentioned in a previous chapter, a Swiss physician, one Louis Odier, writing to a lady friend upon the subject. For the sake of emphasis and to keep our thoughts fixed on the chronology of the birth of rapid communication by means of electricity the text of this letter is repeated:

"I shall amuse you, perhaps, in telling you that I have in my head certain experiments, by which to enter into conversation with the Emperor of Mogol or of China, the English, the French, or of any other people of Europe, in a way that, without inconveniencing yourself, you may intercommunicate all that you wish, at a distance of four or five thousand leagues in less than half an hour! Will that suffice you for glory? There is nothing more real. Whatever be the course of those experiments, they must necessarily lead to some grand discovery; but I have not the courage to undertake them this winter. What gave me the idea was a word which I heard spoken casually the other day, at Sir John Pringle's table, where I had the pleasure of dining with Franklin, Priestly, and other great geniuses."

WHAT was the word spoken at Sir John Pringle's table which gave this Swiss doctor the idea that almost instant communication could be had over ten or fifteen thousand miles? Both Franklin and Priestly were outstanding experimenters in the field of electricity. Did they discuss the possibilities of the telephone and the telegraph? Did they foresee the time when a man could sit in his home or his office in America and talk to London, or any of the great cities of Europe, almost as easily as he might talk to some acquaintance in the next block? Did they foresee the great overland telegraph lines and the overseas cables? Perhaps they did. At least, there must have been something that would bring about a discussion which gave Dr. Odier the ideas he transmitted, by letter, to his lady friend.

In 1769, Volta made known his invention of the electrophorus, a sort of perpetual reservoir of electricity, and on March 20, 1800, announced the Voltaic Pile, although this discovery had been made in 1796. But as early as 1777 he seems to have entertained some idea of an electric telegraph—as noted in a previous chapter—although nothing more appears to be on record in relation to the matter. Sir Francis Ronalds speaks of an autographed manuscript dated April 15th, 1777, in which Volta states that he does not doubt the possibility of exploding his "electrical pistol" at Milan, through wires supported by posts, whenever he discharges a powerful Leyden jar at Como.

In 1792, Claude Chappe, a French mechanician, introduced the semaphore which he at first called a *tachygraphe*, from two Greek words meaning to write fast, but to which M. Miot, chief of one of the divisions of the War Department, gave the name of "telegraph" during the year 1793. This semaphore consisted of a vertical wooden pillar 15 or 16 feet high, bearing a transverse beam 11 or 12 feet long, which turned upon its center and held at each extremity pivoted arms so worked by cords or levers as to admit of 256 distinct signals. The semaphores were placed upon high towers, about four miles apart on level ground, and even as much as ten miles apart upon intervening elevations.

This system of signals was presented by Chappe to the legislature and was originally erected during the month of August, 1794, upon stations between Paris and Lille (Lisle), a distance of about 148 miles. One of the first sentences conveyed between the two places by the Committee of Public Safety consumed 13 minutes and 40 seconds, but it was not long before dispatches could be conveyed in 2 minutes, and it was through Chappe's apparatus that the news of the recapture of the city of Condé was conveyed to the Assembly shortly after the entry of the troops of the Republic.

It was not until 1809 that Samuel Thomas von Sommering, a German anatomist and physiologist, first employed voltaic, or contact, electricity for the transmission of telegraphic signals. Between 1794 and 1809 many improvements were made on the Chappe Semaphore. There was the tellograph (a contraction of the word telelograph) of Edgeworth in 1794, the six shutter telegraph of Lord George Murry in 1795, the telegraphs of the Reverend J. Gamble, a chaplain to the Duke of York, in 1795, and the system proposed by John Garnet during the same year. In 1802, George Frederick Parrot, a Russian physician and professor at Dorpat, who of all the European scientists of these times is the one who developed most extensively the chemical theory of the voltaic pile, also devised a semaphore system of telegraphing, as did Mr. Joseph Davis, in 1805, whose system was simply an improvement on that of Lord George Murry. In 1808, General Charles William Pasley describes "the original and improved methods of construction of his polygrammatic telegraph," which he abandoned in 1823 for his "Universal Telegraph for Day and Night Signals," which, again, was a semaphore system.

The electric telegraph of von Sommering, which was constructed between July 9th and August 6th, 1809, is described by Fahie, in his "History of Electric Telegraphy," as consisting of thirty-five gold rods placed into glass tubes, starting from a reservoir of acidulated water and connecting with thirty-five silk covered wires, which were run into thirty-five apertures of copper (corresponding with twenty-five letters and ten figures) upon a wooden stand, into each opening of which the wires of the voltaic pile could be inserted. When the latter were connected, the bubbles rising through the decomposition of the water were made to enter the lettered glass receivers through which the messages could be deciphered. On August 8th, 1809, he was able to transmit intelligence a distance of 1000 feet, and twenty days later he presented his apparatus to the Bavarian Academy of Sciences.

According to the Journal of the Franklin Institute for 1859 (Vol. XXXVIII, p. 398) von Sommering's telegraph was carried by Dominique Jean Larrey, chief surgeon of the French armies, to Paris, where it was delivered by him to the French Academy of Sciences on December 5th, 1809, and a committee was appointed to report on the new invention. In 1810 and 1811, von Sommering reduced the number of wires in his apparatus to twenty-seven. These brass or copper wires were first insulated with a covering of gum lac and then a silk thread, after which they were united into a thread covered cable 1000 feet in length. The cable was in turn covered with heated gum lac, or with a ribbon plunged in a solution of the same substance. The Russian Count Jeroslas Potocki took the new instrument to Vienna and submitted it on July 1st, 1811, to the Emperior Francis I., while another model of the apparatus was sent to William von Sommering, then at Geneva, where it was shown to De la Rive, Augustus Pictet and other scientists. During March, 1812, this instrument transmitted messages 10,000 feet, or ten times the distance previously reached.

Reizen in 1794, Salva in 1798, and Ronalds in 1816, all proposed a system of visual telegraphy by interrupting electric circuits, causing an electric spark to appear at the point of disconnection of each wire, as desired. In 1831, Henry constructed and successfully operated an electro magnetic signaling apparatus, which consisted of a magnetized steel bar, ten inches in length, which was supported on a pivot in a horizontal position with its north end between the two arms of a horseshoe magnet. When the latter was energized by the current, and the end of the bar was attracted by one arm of the horseshoe and repelled by the other, it caused the further extremity to strike a suitably adjusted bell, and a code was arranged by varying sound combinations.[1]

The action of the electric current on a magnet was first applied to electric telegraphy by Ampere in 1820, at the suggestion of La Place who believed that the deflections of small magnets placed at the receiving ends of 26 wires could be used to indicate the letters of alphabet. Ampere's apparatus was the pioneer of a number of needle instruments which came into extensive use between the years 1829 and 1841.[2]

Samuel Finley Breese Morse, who is rightly accredited with being the inventor of the first practical recording electric telegraph, was born at the foot of Breed's Hill, in Charlestown, Massachusetts, April 27, 1791. This was the year before Chappe introduced his semaphore tachygraphe, and two years before the coining of the word "telegraph," but, curiously enough, the same year in which Michael Faraday was born. But, unlike Faraday, who had no education to speak of except that which he gleaned from the books that came into his employer's shop to be bound, or Edison, whose early education came almost entirely from his mother, Morse had every educational advantage available at the time.

HIS father was Jedediah Morse, D.D., who came of a long line of highly cultured and educated forebears. Dr. John Todd has said of him: "Dr. Morse lived before his time, and was in advance of his generation." According to S. L. Prime (Life of S. F. B. Morse, D. Appleton & Co., 1875), he was "a projector, author, founder, inventor. His works were in the line of intellectual and moral progress, but to him the world owes large and lasting gratitude, as well as to his illustrious son. In early years he exhibited a fondness for books; and a delicacy of constitution unfitting him for the severe labors of the farm, his ardent desire for education was gratified by his judicious and intelligent father. In the spring of 1779, in the midst of the War of American Independence, he was admitted into Yale College . . . . He studied theology under the Reverend Dr. Jonathan Edwards, son of President Edwards, and Professor Samuel Wales. Before he was licensed to preach, and while teaching school in New Haven, he projected and began his 'American Geography' which afterward was inseparably identified with his name."

"He was a man of genius," says Prime, "not content with what had been and was; but originating, and with vast executive ability combining, the elements to produce results. To him, more than any other one man, may be attributed the impulses given in his day to religion and learning in the United States. A polished gentleman in his manners; the companion, correspondent, and friend of the most eminent men in Church and State; honored at the early age of thirty-four with the Degree of Doctor of Divinity by the University of Edinburgh, Scotland, sought by scholars and statesmen from abroad as one of the foremost men of his country and time, such a man was the father of the inventor of the Telegraph."

But Finley Morse, as he is often spoken of in early histories, did not have to depend entirely on heritage. At the age of four, he was placed in a small private school conducted by an invalid woman known locally as "Old Ma'am Rand." When seven years old he was sent to the preparatory school of Mr. Foster, at Andover, where he was fitted for entering Phillips Academy, there to spend several years preparing for Yale. Like Edison and Faraday he seems to have lived largely in a world of books, one of his favorites being Plutarch's "Lives of Illustrious Men." At the age of fourteen he was thoroughly qualified to enter Yale, but his father held him back and he entered in the class of 1807 at the age of sixteen.

At this time, Jeremiah Day was Professor of Natural Philosophy at Yale, and under his instructions Morse began the study of electricity. Forty years after Morse had left the institution, Mr. Day wrote this note:

"In my lectures on Natural philosophy, the subject of electricity was especially illustrated and experimented upon. Enfield's work was the text book.

"The terms of the 21st proposition of Book V of 'Enfield's Philosophy' are these:—'If the circuit be interrupted, the fluid will become visible, and when it passes it will leave an impression upon any intermediate body.'

"I lectured upon and illustrated the first two experiments propounded by the 21st proposition, and I recollect the fact with certainty, by memoranda now in my possession. The experiments referred to are in terms as follows:

" 'Experiment 1st:—Let the fluid pass through a chain, or through any metallic bodies, placed at small distances from each other, the fluid in a dark room will be visible between the links of the chain, or between the metallic bodies.'

" 'Experiment 2nd:—If the circuit be interrupted by several folds of paper, a perforation will be made through it, and each of the leaves will be protruded by the stroke from the middle to the outward leaves.' "

"This," says Prime, "was the germ of the great invention that now daily and hourly astonishes the world (Prime was writing in 1875), and has given immortality of fame to the student, who, twenty-two years afterward, conceived the idea of making this experiment of practical value to mankind." Morse himself said, in 1867:—"The fact that the presence of electricity can be made visible in any desired part of the circuit was the crude seed which took root in my mind, and grew up into form, and ripened into the invention of the Telegraph."

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[1] See Encyclopedia Britannica.

[2] See Encyclopedia Britannica.

But it was Professor Benjamin Silliman to whom, more than anyone else, Morse was indebted for those impressions which finally resulted in the invention of the first practical telegraph system. Professor Silliman gave a course of lectures on chemistry and galvanic electricity. The batteries then in use were the Voltaic Pile, the battery of Cruickshanks, and the *Couronne des tasses* (the crown of cups mentioned in a previous chapter). Silliman always exhibited these batteries to his classes, taking them apart and putting them together again. Morse was one of his pupils. Furthermore, ten years after his graduation, Morse often went to Silliman's laboratory and watched his experiments.

Originally Morse had no intention of being a business man or a scientist; his one ambition was to become an artist. His father was a man of large views, and, while he had given his son a liberal education, he yielded to the son's desires to turn away from the learned professions and become a painter. Eventually he turned him over to Washington Allston, who had returned from Europe in 1809 and who was then the greatest artist in this country, Allston took Morse to Europe in 1811, and, even though he was determined to become a painter, his first letter home expresses a longing that was almost prophetic, when he wrote:

"I only wish you had this letter now to relieve your minds from anxiety, for while I am writing I can imagine mother wishing that she could hear of my arrival, and thinking of thousands of accidents which may have befallen me. *I wish that in an instant I could communicate the information: but three thousand miles are not passed over in an instant, and we must wait for long weeks before we can hear from each other."* On the outside of this letter, written in his own hand with pencil, but at what date is not known, are these words: "Longing for a telegraph even in this letter."

Soon after he arrived in London, Allston took Morse to call upon Benjamin West, one of the greatest artists of his time. Although an American, he was at the head of the Royal Academy of England and was a great favorite of the King. West always remained true to his native country, yet he always retained the confidence of the King and was actually at work on a portrait of him when he was given the Declaration of Independence. Mr. Morse relates an interesting incident in connection with this occasion, which was told to him by West himself. Turning to the picture of the King, West said:

"Do you see that picture, Mr. Morse?"

"Yes, sir," I said; "I perceive it is the portrait of the King."

"Well," said Mr. West, "the King was sitting for me for that portrait when the box containing the American Declaration of Independence was handed to him."

"Indeed," I answered, "and what appeared to be the emotions of the King? What did he say?"

"Well, sir," said Mr. West, "he made a reply characteristic of the goodness of his heart," or words to that effect. " 'Well, if they can be happier under the government they have chosen, than under mine, I shall be happy.' "

MORSE achieved considerable success as a portrait painter in England, receiving and executing a number of commissions. On Aug. 21, 1815, he started for America and it is interesting to note that he had to wait fourteen days in Liverpool "for a fair wind." He arrived in Boston on Oct. 18, after a passage of 58 days and an absence from his country of more than four years. He opened a studio in Boston, but when an entire year dragged by without his receiving a single order, he went to New York where he spent the years from 1826 to 1829 both as a teacher and a pupil. In 1827 he again renewed his interest in electricity and particularly in electro-magnetism, becoming intimately associated with James Freeman Dana who was giving a course of lectures on the subject before the New York Athenaeum. The year following he became eminently successful as a painter, his sitters becoming so numerous that he was unable to meet and fill all of his orders. Finally, while still President of the National Academy and among the first of his profession in the United States, he resolved to go abroad again. Leaving his children in the care of relatives (his wife had died) he sailed from New York, Nov. 8, 1829.

To follow his career in Europe during the next three years would require more space than can be alloted in this chapter. As a painter his success continued and many persons of historical importance, among them General Lafayette, became his friends. Among his artist friends was R. W. Habersham, of Augusta, Georgia, who claims to have had a conversation with him in Paris in which he first suggested the telegraph. This was confirmed by J. Fenimore Cooper, the author, although Morse himself could not recall the conversations to mind. His own recollection of his first conception of the telegraph dates from October, 1832, on board the ship Sully, while he was returning to America. In the early part of the voyage conversation at the dinner table turned to recent discoveries in electro-magnetism and particularly to experiments by Ampere and Franklin. At one point in the discussion Morse said: "If the presence of electricity can be made visible in any part of the circuit, I see no reason why intelligence may not be transmitted instantaneously by electricity." From that time on he seems to have thought of little else.

The identity of lightning and electricity had been known for a long time. Signals had been made at a distance by electricity and intelligence transmitted, just as beacon fires had, from time immemorial, flashed the knowledge of events across continents. But this was not the idea back in the brain of Morse. What he was thinking about was the transmission of intelligence and the *recording* of it at a distance. To him nothing else was a telegraph. It must be an instrument which could *write* at a distance. "If it will go ten miles without stopping," he said, "I can make it go around the globe." He explained his ideas to Captain Pell of the Sully, and just before the vessel arrived in port he said to him: "Well, captain, should you hear of the telegraph, one of these days, as the wonder of the world, remember the discovery was made on the good ship Sully." Captain Pell stated under oath, that when he saw the instrument Sept. 27, 1837, he recognized in it the same mechanical principles and arrangements which he had Mr. Morse explain on board of the Sully in 1832.

Hardly had he arrived on American soil before Morse began to construct an instrument which would test the practicability of his idea. From this hour on there began a struggle which was to last for twelve long years. His mind was absorbed with the idea of a recording telegraph, while at the same time he was wholly dependent upon his profession as an artist. He had three small children and no money. He had long received assistance from his father and brothers but it seemed to him like stealing to take this money for his experiments—it was the old story of genius contending with poverty.

"Up to the autumn of 1837," he says, "my telegraphic apparatus existed in so rude a form that I felt a reluctance to have it seen. My means were very limited—so limited as to preclude the possibility of constructing an apparatus of such mechanical finish as to warrant my success in venturing upon its public exhibition. I had no wish to expose to ridicule the representative of so many years of laborious thought. Prior to the summer of 1837, at which time Mr. Alfred Vail's attention became attracted to my telegraph, I depended upon my pencil for subsistence. Indeed, so straightened were my circumstances that, in order to save time to carry out my invention and to economize my scanty means, I had for many months lodged and eaten in my studio, procuring my food in small quantities from some grocery, and preparing it myself. To conceal from my friends the stinted manner in which I lived, I was in the habit of bringing my food to my room in the evenings, and this was my mode of life for many years."

When Morse finally had his recording telegraph instrument ready to submit to the public, he decided he would show it first to a "few intelligent and appreciative friends in New York." Among those were General Thomas S. Cummings, who had recently been promoted to a military command, and in allusion to that fact one of his friends wrote the first message ever recorded by the Telegraph. It was: "Attention, the Universe. By Kingdoms, Right Wheel."—A Fac-simile of the original strip on which this was recorded will be found on page 332 of Prime's "Life of S. F. B. Morse."

On February 21st, 1838, Morse demonstrated his telegraph before the President of the United States and his cabinet and a bill was subsequently passed appropriating $30,000 to be expended on a series of experiments to test its practicability. According to the Encyclopedia Britannica, Morse applied for his first patent on April 7th, 1838, and it was granted on October 24th, 1848. This is probably a typographical error and should read "1838," but the facts seem to be (according to Prime and well supported by correspondence) that his first patent was granted in the year 1840. The bill appropriating the $30,000 to test its practicability was not passed until February 23rd, 1843, and then only by the close vote of 89 to 83. When the vote was finally recorded, however, it was found to stand yeas 90, nays 82,—a majority of 8. Professor Morse himself made a careful analysis of this vote in the House of Representatives and it is worth noting.

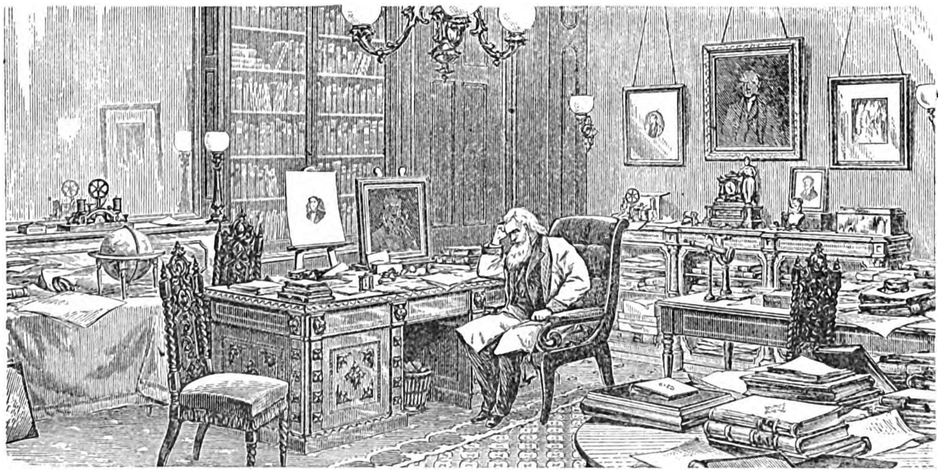
GROUPING the states of Maryland, Virginia, North and South Carolina, Georgia, Kentucky, Tennessee, Louisiana, Mississippi and Alabama, 47 representatives voted against the appropriation, 14 voted for it and 31, according to Morse's own record, were "neutral." The New England States voted as follows: 17 ayes, 9 noes, and 8 neutral. Grouping the states of New York, Pennsylvania, New Jersey, Delaware, Ohio, Indiana and Illinois, the vote stood: ayes 58, noes 25, and 22 neutral. It would seem that the North was strongly in favor of the appropriation, while the South opposed it.

The work of constructing a line from Washington to Baltimore was started almost immediately. The first plan was to enclose the wires in tubes laid in the earth. Ezra Cornell, founder of Cornell University, had invented a machine to lay pipe and he was employed to take charge of the works under the superintendence of Mr. Morse. When two thirds of the appropriation was expended it was estimated that it would take another $30,000 before the work could be completed. Morse then recommended that the tubes be abandoned and the wires placed on poles. This was adopted and within a short time the forty-mile pole line was built.

On the 24th day of May, 1844, after some private practice and experiments over the line, Morse was ready for his great public demonstration. He had invited his friends to assemble in the chamber of the U. S. Supreme Court, where he had this instrument, from which wires extended to Baltimore. He had promised a young friend, a Miss Ellsworth, that she should send the first message. Her mother suggested the words of Scripture (Numbers XXIII 23) "What hath God wrought!" The whole verse reads; "Surely there is no enchantment against Jacob, neither is there any divination against Israel: according to this time it shall be said of Jacob and of Israel, What hath God wrought!"

Taking his seat at the instrument, Morse slowly sent the selected words. The message was instantly received by his assistant, Mr. Vail, in Baltimore, who was ignorant of the message to be sent and who returned it immediately to Washington. "Within a single moment of time," says Prime, "those inspired and inspiring words were carried back and forth through a circuit of eight miles." Failing to sell the telegraph to the government for $100,000, Morse enlisted private capital and in the same year a company was organized to erect a telegraph system between New York, Baltimore and Washington. By 1851, fifty companies using Morse telegraph patents were in operation in the United States and by 1861, Morse patents were in operation in several countries of Europe.

The story of the electric telegraph from this time on has been touched upon in other chapters and is too well known to require further comment here. The next chapter in the story of electricity and communications is the development of the telephone.



Professor Morse in his Study.

A Novel Campaign for the Presidency of a N. E. L. A. Company Section

THE Duquesne Light Company of Pittsburgh, Pa., elects the officers of the N. E. L. A. Company Section by popular vote. The candidates, particularly those running for president, put on a regular political campaign, and quite a lot of interest is usually worked up in the company over this election. Usually a campaign manager with a committee is appointed by the candidate, and this committee functions in the usual political way, assisted by the candidate in personal visits throughout the system, meeting the various employees and making the usual stump speeches.

Experience in the past demonstrated that it is exceedingly difficult for a candidate from a general office or so-called staff department, usually rather small, to win the election over a candidate from the very much larger operating department. The controlling vote is carried by the large field forces.

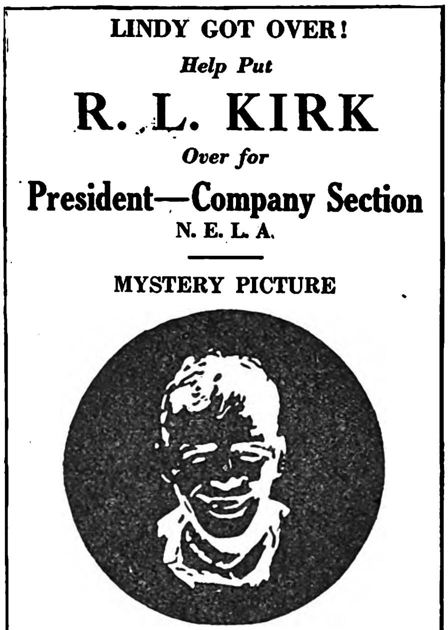
R. L. Kirk, assistant to the manager of the relatively newly created System Development Department, was therefore handicapped when he was nominated to run against one of the most popular and well liked men in the operating department. This was particularly noticeable when the nominations were announced at the usual meeting when a tremendous ovation was given the operating candidate and the announcement of the System Development Department candidate was practically unnoticed. With this background it is rather interesting to note the method employed by the staff department man to win the election, even though by a small majority, over the better known operating man.

The first step, devised by a board of strategy consisting of a small group of Mr. Kirk's supporters, was to prepare a poster for the bulletin boards throughout the system, designed to create interest in advance of the campaign. This poster consisted of a cartoon of a flying airplane with a miniature figure of Kirk waving from the cockpit. The wings of the plane bore the slogan "Kirk for President," and beneath appeared the words "Let Kirk be your pilot for 1930." To the right of the poster and in heavy type was the catch phrase, "Ask for your Mystery Card," and below this appeared the campaign slogan, "Something Different."

The preparation of a Mystery Card and Mystery Packages was begun, and carried on with great activity and much secrecy. A Collection Committee was organized, consisting of Messrs. Johnson, Carroll, Oldenburg, Stearns, Domer, and Gauss. Messrs. Egger and Boyer assisted the above committee in filling the Mystery bags.

This committee immediately got in touch with various manufacturers and distributors throughout the city and began collecting a large quantity of souvenirs, all of which had real tangible value, but were of a purely advertising nature. The manufacturers were advised that Mr. Kirk was running for president of the Duquesne Light Company Section of the organization, and wanted to conduct a novelty mystery campaign, and would come in contact with about two or three thousand employees who, as a class, represented typical Pittsburgh people. Inasmuch as considerable interest has always been shown in these campaigns, it would be an excellent means for advertising various articles by contributing to a Mystery Package which would be delivered to each individual to be taken to their homes. The response to this invitation was tremendous, as some fifty-five companies contributed approximately 25,000 items (not counting thousands of book matches).

In the meantime a novel campaign card was prepared by the candidate introducing something new in the form of an optical illusion. On one side of the card was the mystery picture, reproduced on this page, with the slogan, "Lindy got over—Help put Kirk over for President," on the top of the card. On the other side was the candidate's picture together with his campaign platform and the slogan, "Something Different," showing in several places.



LINDY GOT OVER!

Help Put

R. L. KIRK

Over for

President—Company Section

N. E. L. A.

MYSTERY PICTURE

"LINDY"

INSTRUCTIONS—Take card in both hands and look steadily at small diamond shaped speck on nose. Try not to blink, and count slowly to 40. Then look steadily up into sky or at a lighted wall for at least 10 seconds.

RESULT—The actual enlarged photograph will appear and disappear many times.

"Something Different"

This card, when distributed, created quite a sensation throughout the system.

On the Monday morning of the week of distribution, the candidate, with an assistant and a car bearing large posters on all windows "Kirk for President" and loaded to its capacity with Mystery Packages, set out to trail the paymaster to the various power plants and outlying districts. As the employees passed the paymaster they met the candidate, were given a Mystery Card and a Mystery Package, and their attention called to the fact that the campaign slogan "Something Different" would be carried out during the administrative year in the affairs of the Association if the candidate was successful in the election. It is needless to say that such a move was received with interest by the average employee; in fact, so much enthusiasm was shown in many cases that the candidate was nearly stampeded by the crowds seeking their packages before the supply was exhausted.

Requests for Mystery Cards were so numerous, not only from company employees, but from people all over the city of Pittsburgh, and indeed as far east as Harrisburg and Philadelphia, that a member of the campiagn committee was kept almost continuously busy mailing out cards to meet the demand. In fact, 2000 extra cards were printed at the last moment in order to have sufficient to go around, making a total of 6000 given out.

The committee wishes to emphasize the fact that the entire cost of the campaign to the candidate was only the cost of the usual campaign cards, as all the other items were cheerfully donated as advertising matter.

It is interesting to note that so unusual was it for a staff department man to win over an operating department man that even a few minutes before the announcement regarding the election was made at the last meeting there were quite a few bets placed at considerable odds in favor of the operating man. All of which goes to prove that it pays to advertise.

CORRESPONDENCE

The Electric Water Heater

High Wattage vs. Low Wattage Types

To The Editor:

In the October issue of the N. E. L. A. Bulletin there appeared the James H. McGraw Paper "The Electric Water Heater" by H. Geo. D. Nutting. In this paper the old controversy relative to the merits and demerits of the high wattage small storage and low wattage large storage types of electric water heaters is revived. Probably the most fundamental point with respect to the electric water heater is that the user be satisfied. It is generally agreed that in order to give satisfactory service the heater must possess the following characteristics:

1. The load characteristics and demand must be such that the utility can supply electric current at a cost comparable with other fuels.
2. The heater must have reasonably rapid recuperation.
3. The storage capacity must be sufficient to care for the greatest single draw of water desired.
4. The cost of the heater plus the cost of installation must be within the limits that the customer is willing to pay.
5. The installation should be simple and reliable (free from control devices which restrict the supply of hot water or which may fail in service).

Mr. Nutting has very ably pointed out the extent to which both high and low wattage heaters conform to some of these requirements, but there are others on which it appears that additional information is desirable for clarification and accuracy.

ITEM 1

One of the principal advantages of the low wattage heater is that it gives a large proportion of night time load. This is particularly the case where more than one heating element is used, since the upper element will cut off when the heater is partly full of hot water, leaving the lower element to complete the heating. Due to the necessarily rapid recuperation of a small capacity tank equipped with a high wattage heating element the recuperation is accomplished within an hour from the time of drawing water. This eliminates the possibility of night time load.

The accompanying chart shows the comparative loads obtained from various types of water heaters. This chart is based on the following:

Cold water supply, 50 deg. Fahr.

Heated water temperature, 150 deg. Fahr.

Average daily use of hot water per family, 50 gallons.

Average consumption of hot water as follows:

Morning (7.30 to 10.30 a. m.), 30 per cent equals 15 gallons.

Noon (12 to 1 p. m.), 10 per cent equals 5 gallons.

Early evening (5 to 7 p. m.), 15 per cent equals 7½ gallons.

Evening (8 to 10 p. m.), 45 per cent equals 22½ gallons.

100 per cent equals 50 gallons.

In order to distribute these quantities of water uniformly over the periods in which they are used, the draw-offs are distributed as follows:

3¾ gallons drawn at 7.30, 8.30, 9.30 and 10.30 a. m.

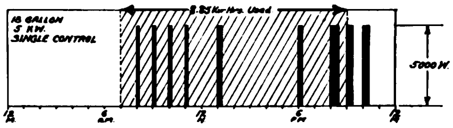
2½ gallons drawn at 12 noon and 1 p. m.

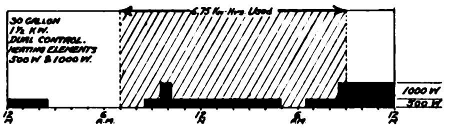
2½ gallons drawn at 5, 6 and 7 p. m.

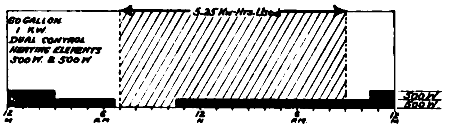
7½ gallons drawn at 8, 9 and 10 p. m.

The shaded portion of the chart from 7 a. m. to 9 p. m. represents the average period of maximum central station demand (or on-peak period). The black blocks represent the intensity and duration of the heater load. By adding up this load we find that the electrical energy used during the on-peak period is as follows:

18 gallon 5 kw. Single Control 8.85 kw-hr.
30 gallon 1½ kw. Dual Control 6.75 kw-hr.
60 gallon 1 kw. Dual Control 5.25 kw-hr.







In addition to the large amount of night time use, the low wattage heater does not require a large increase in the capacity of the service transformers or heavier wiring from the transformer to the house.

ITEM 2

In the high wattage, small capacity type of water heater there is no advantage in dividing the heating element into two or more circuits since a draw-off of 10 gallons of hot water will bring all the stages of heat on practically simultaneously. With the low wattage, large capacity heater the use of more than one heating element is a decided advantage, since draws of 10 gallons of water will not cause the upper element to be cut on and the recuperation will be accomplished by means of the lower element only. In case a large enough draw has been made to cause both elements to cut on the upper one will cut off when the tank is partly heated, leaving the lower element to finish the heating. This gives a prolonged load and is largely responsible for the large proportion of night time load obtainable with a low wattage heater. Naturally, a heater consuming a large proportion of night time load merits a lower rate on account of the smaller share of fixed charges chargeable against it.

ITEM 3

The use of high wattage heaters frequently requires the installation of a double throw switch between the range and the water heater in order to prevent excessive loading of the service transformer, etc., and the use of such a switch often prevents rapid recuperation of a small capacity tank at times when rapid recuperation is most necessary. One of the principal objections to the small tank is that the hot water supply will fail sooner when large draws of hot water are required and if immediate recuperation is not possible the customer will be without hot water. Large storage capacity (30 to 60 gallon) eliminates this necessity of rapid recuperation and provides an ample reserve of hot water to draw on. Where low wattage is used in conjunction with large storage capacity recuperation can take place at any time since load limiting devices are not necessary.

ITEM 4

As Mr. Nutting pointed out, the cost of the heater, whether high or low wattage, will to a large extent depend on the manufacturer. However, the cost of installation is an entirely different matter. The majority of electric water heaters are not sold to new homes but to homes where electric wiring has been installed for some time. Low wattage heaters can usually be connected on to these lines without change, but high wattage frequently require a heavier service entrance. The cost of these changes will often prevent the sale of a water heater if the customer is required to pay them. If the utility absorbs these charges they must be paid for through a higher rate.

ITEM 5

Mr. Nutting's discussion on the desirability of a simple and reliable installation is quite complete and requires no comment, with the exception that it is frequently found necessary to require the installation of a double throw switch between the range and a high wattage water heater in order to prevent excessive loading of the service transformer. As previously pointed out, the use of such a switch often tends to restrict the supply of hot water when it is most needed.

The foregoing discussion has been restricted to the five fundamental points which are necessary to give the customer satisfactory service. In addition to the points previously mentioned, there are additional features which should be given consideration.

In rural communities the distribution network and service transformers are comparatively light and usually are not capable of handling the heavy loads imposed by high wattage equipment. If it is necessary to replace the network and transformers in order to serve these heaters the investment is prohibitive. On the other hand, low wattage heaters (1 to 1½ kw.) can usually be connected on without any change. It has been the writer's experience that the 30 gal. capacity rated at 1½ kw. will serve from 90 to 95 per cent of the families using electric water heaters.

The high wattage, small capacity heater appeals to the small user of hot water. This is a stumbling block since the small use of current results in a very high proportion of fixed charges against the heater and the amount of current consumed and paid for will not be great enough to absorb these fixed charges. It follows, therefore, that this small user must be served either at a higher rate or else at a loss.

Mr. Nutting maintains that if it is feasible to prevent wash day from coming on the system peak that the diversity factor of 5 kw. water heaters can be close to 5 to 1. How close the diversity can be to this figure is not known but basing calculations on the ideal 5 to 1 diversity he shows that the cost to serve a 5 kw. heater even under these conditions is over 25 per cent greater than to serve a 1 kw. heater which is operating under ordinary conditions.

The low wattage heater has proved its position as a load builder and as one which can be served at a low price. Under ideal conditions high wattage may give a good load factor, but experience has shown that when these conditions change the utility is saddled with a lot of heaters which must be served at a loss unless it is possible to increase the rates with the consequent difficulties and customer dissatisfaction.

Harry A. Williams
Engineer, Hynes & Cox Electric Corp.
Albany, N. Y., Oct. 31, 1929.

The Incandescent Lamp

A Letter from Mr. Kenneth Swan

Editor's Note: It is felt that since the following correspondence is self-explanatory, no editorial comment is necessary.

To the Editor:

In an article by Mr. Ernest Greenwood, published in the N. E. L. A. Bulletin of October, 1929, entitled "Behind the Veil," there are certain statements made or quoted with reference to Sir Joseph Swan's work on the incandescent lamp which appear to me to be inaccurate, and certain suggestions made which are unfounded and injurious, and I rely on your sense of fairness to allow me to correct them.

The article quotes Mr. Fleming (now Sir Ambrose Fleming) as saying, "Early in 1880 Swan devised an improvement upon the form of carbon conductor which he used in his 1878 lamp. He had evidently recognized that carbon could not be obtained in so suitable a form by cutting down a large mass of carbon as by carbonizing some organic material already in filamentary form." The fact (with which Sir Ambrose was probably not then acquainted) is that Swan had as early as 1860 recognized the suitability of fibrous organic material in filamentary form, and had produced perfectly satisfactory carbon spirals and horseshoe forms from paper (sometimes parchmentized paper) and cardboard, and had carbonized these by heating them to a high temperature in charcoal powder; the filaments so produced were exceedingly strong and flexible. He experienced difficulty, however, in mounting these filaments, and therefore as temporary expedient, in order more speedily to test the question of the durability of the lamp having a carbon filament mounted in vacuum, he had thicker filaments lamp made by Carre in Paris. It was one of these filaments which was used in the lamp shown in December, 1878.

Meanwhile he continued his experiments to devise means of getting a stronger filament having the characteristics of his paper spirals and horseshoe filaments, and in pursuance of these researches he hit upon the idea of using parchmentized cotton instead of parchmentized paper. He had been familiar with the method of parchmentizing paper and other fibrous materials for many years past. This parchmentized cotton filament became the basis of the early commercial manufacture of lamps in England and on the Continent.

What hand had Edison in this? In what way is it suggested that he contributed to this result? The suggestion seems to be made in this article that Swan was influenced by what Edison was doing and copied his work. This is quite untrue. Swan had no means of knowing what Edison was doing except in so far as the American newspapers from time to time purported to give accounts of Edison's achievements.

Swan heard, no doubt, in this way of Edison's use of paper and cardboard filaments and wrote to *Nature* to say that he had made filaments of this nature many years ago.

It is wholly untrue to say that Swan's work or ideas were in any way influenced by Edison's experiments. On the other hand, one might ask why was it that Edison, who in 1877 and 1878 had tried carbon and given it up as hopeless, suddenly recommenced experimenting with carbon "in the fall of 1878," to quote the date assigned by Mr. Greenwood. It has been suggested, but whether truly or not I do not know, that this sudden volte face of Edison's was due to his hearing of Swan's success with his carbon filament lamp "in the fall of 1878."

Swan's first public exhibition of his carbon filament lamp in December, 1878, was ten months before the date of the achievement of Edison, which the United States have been celebrating.

It is said in the article that Swan's lamp of December, 1878, was discarded as commercially impracticable. This is quite untrue. It was certainly not as practical a form of lamp as those which Swan made a few months later, but it was in no sense discarded. It satisfied Swan that he had solved the problem, and he at once set about improving the filament. Similarly, ten months later, Edison produced a lamp with a slender carbonized sewing cotton filament. Was this a practical form of lamp? Admittedly it was not. And accordingly Edison set to work to find a practical form of filament; trying first of all paper and cardboard, and as these proved unsatisfactorily, resorting ultimately to a special species of bamboo.

No exact date, so far as I can discover, is assigned either to Swan's first use of parchmentized cotton or Edison's first use of bamboo. Both events are placed early in 1880.

But priority seems to me after all to be a matter of minor account. The question is to whom is the world indebted for the lamp? No doubt America is greatly indebted to Edison in this matter, and equally beyond doubt England is wholly indebted to Swan.

As regards the invention of the means of producing a satisfactory carbon filament, there can be no question that the world owes more to Swan than to Edison.

The parchmentized carbon filament of Swan's invention was far more widely used than Edison's bamboo filament, and, in fact, outlived it until it was itself superseded by Swan's invention of the squirted filament, which became universally used—and gave rise to an enormously increased use of the carbon filament lamp.

Kenneth R. Swan.
London, Nov. 5, 1929.

Mr. Greenwood's Reply

To the Editor:

I HAVE your memorandum accompanying a letter from Mr. Kenneth Swan, son of Sir Joseph Swan, in which he takes exception to my "Behind the Veil" article, subtitled, "Corralling the Incandescent Lamp," in the October number of the N. E. L. A. Bulletin, on the basis that it contains implications with regard to the work done by his father and by Thomas A. Edison on the incandescent lamp which are unfounded and injurious to his father's work.

I appreciate the spirit in which Mr. Swan's letter is written. An account of history, after all, is of little value if it contains inaccuracies or if it ignores statements by those whose position entitles them to having their statements treated with regard. In the history which I have been furnishing you in the series entitled "Behind the Veil," I have endeavored to be as accurate as possible, and I most certainly have had no thought of according credit where credit is not due. I think, perhaps, that my last article giving unlimited credit to Michael Faraday when I might have, with just a little bit of mental gymnastics, divided the credit between Faraday and the American Joseph Henry, is evidence of this.

After calling attention to the fact that I quoted Sir Ambrose Fleming as saying "early in 1880 Swan devised an improvement upon the form of carbon conductor which he used in his 1878 lamp" and that "he evidently recognized that carbon could not be obtained in so suitable a form by cutting down a large mass of carbon as by carbonizing some organic material already in filamentary form," Mr. Swan says: "The fact (with which Sir Ambrose was probably not then acquainted) is that Swan had, as early as 1860, recognized the suitability of fibrous organic material in filamentary form, and had produced perfectly satisfactory carbon spirals and horseshoe forms from paper," and so on.

I agree. In this connection may I call attention to my statement in the article, as it appears on page 633, in which I say: "At various times, from 1848 to 1860, he (Swan) made a number of experimental lamps, all of them consisting of carbonized strips and spirals of paper and cardboard, coated with various liquids, which, on being heated, left a large residue of carbon. These lamps were operated in partial vacuum, either in a glass bottle having a wide neck closed with a rubber stopper, through which the connecting wires passed, or in a glass bell whose rim made a tight fit within the rim of a brass plate through which one insulated connecting wire passed, the plate being used as the other connection. Due partly to some trace of the air being left within the glass container, and partly to the carbons becoming distorted, the lamps soon broke down."

It seems to me that the only difference between Mr. Swan and myself in this connection is that he says "he experienced difficulty, however, in mounting these filaments and therefore as a temporary expedient, in order to more speedily test the question of the durability of the lamp having a carbon filament mounted in vacuum, he had thicker filaments lamp made by Carre in Paris," while I go into some detail as to these difficulties. Certainly, I would be the last to deny that Sir Joseph Swan was experimenting with carbonized fibrous materials in the hope of producing a practical filament for an incandescent lamp long before 1879. However, it seems, according to Mr. Swan's letter, that it was the thicker filament made by Carre which was used in the lamp shown in December, 1878. Also, Sir Ambrose Fleming has stated that one of these lamps is now to be seen in the National Science Museum in London.

Mr. Swan goes on to say that his father, Sir Joseph, "continued his experiments to devise a means of getting a stronger filament . . . and in pursuance of these researches he hit upon the idea of using parchmentized cotton, instead of parchmentized paper." He then asks: "What hand had Edison in this? In what way is it suggested that he contributed to this result?"

Mr. Swan follows these questions with the statement that "it is wholly untrue to say that Swan's work or ideas were in any way influenced by Edison's experiments." May I say that in this connection I was most careful to quote an English authority—or one whom I feel I had every reason to accept as an authority. It was Sir Ambrose Fleming, D.Sc., F.R.S., whom I quoted as saying: "Toward the middle, or close, of 1879, Swan and Stearn became aware that Edison had abandoned the use of metallic wires and had applied for patents for an incandescent lamp containing a 'filament' of carbon." If Sir Ambrose cannot be considered an authority, or if it can be shown that he had no personal knowledge of the facts, then, of course, I can only regret that I accepted his statement as a statement of known fact. The same "mistake," however, was made by the *Journal of the Institution of Electrical Engineers* (British), for this statement appears in the February, 1929, number of that publication.

I am inclined to agree with Mr. Swan that this whole question of presumptive dates as to when the first lamp to use a carbonized cotton thread as a filament was actually lighted by passing an electric current through the filament is a matter of minor account, and that the same thing is largely true of the lamp with a bamboo filament. The fact remains that Edison's first cotton thread lamp actually burned for forty hours beginning on October 21, 1879, and that on December 21st of the same year Mr. Edison gave a public demonstration consisting of "about sixty lamps mounted on poles lighting the laboratory grounds and country roads in the neighborhood" and also in "several houses." Mr. Swan places the first use of parchmentized cotton by his father as early in 1880 and at that time Edison had already discarded cotton for other filaments which would give his lamps several hundred hours of life.

I would like to add that in my opinion entirely too much stress has been laid on the question of the "practical incandescent lamp" and not enough on the question of a "practical system of lighting by means of incandescence." The lamp itself might almost be considered as a symbol. It would have been of little value without the solution of the problem of sub-dividing the electric current successfully — which scientific men in England of that time said could not be done; without Mr. Edison's constant voltage dynamo; his system of distribution; or the countless other things he had to invent before the first central lighting station went into operation. Personally, I am more than willing to abandon all discussion as to priority with regard to the first cotton filament lamp which could actually be lighted, although, at the same time, holding to my original opinion. It is a matter of no moment. Light's Golden Jubilee, as held in the United States during 1929, was a celebration of the fact that Mr. Edison did give to the world a complete system of artificial lighting by incandescence as we know it today, and I cannot admit that this is not a fact.

Ernest Greenwood.

New York, Nov. 18, 1929.

Correction

THE article on page 698 of the November N. E. L. A. Bulletin entitled "Mr. Arkwright's Address at Port Huron" should have been headed "Mr. Davidson's Address at Port Huron" and the reference to Mr. Arkwright in the Editor's Note, of course, referred to Mr. J. E. Davidson, president of the Nebraska Power Company and past president of the N. E. L. A., rather than to Mr. P. S. Arkwright, president of the Georgia Power Company and also a past president of the Association.

The editor regrets very much this mix-up in identities.

Service Suggestions

NATIONAL ELECTRIC LIGHT ASSOCIATION — COMMERCIAL NATIONAL SECTION
CUSTOMER RELATIONS COMMITTEE
H. T. EAST, *Chairman*, Public Service Co. of Northern Illinois, Chicago, Ill.

To formulate efficient methods of conducting relations between the customer, the public and the supply company, including such matters as taking applications in the office, forms, order routing, inquiries, complaints, meter reading, collections and credits

No. 78 December, 1929

Bill Delivery Policies

By Customer Relations Committee, Great Lakes Division, N. E. L. A.

An important phase of customer relations is the delivery of electric service bills. This is a monthly contact, the value of which cannot be stressed too much. Bill delivery is the culminating step in the processes of rendering bills. Every effort should be exerted to insure the delivery of the bill at the proper time and at the proper place. Three methods of bill delivery are in common use: United States mail; delivery by specialized bill deliverers; and delivery by meter readers. In making a decision on any plan of delivering bills several factors must be considered. In addition to the item of cost there is the public relation question involving the effect of the plan on both the customer and the company. Circumstances in a large measure determine what practice is standard in each particular case.

Delivery by United States Mail

Delivery through the mails has found favor with a large number of utilities who base their plan exclusively on public relations. Its main advantages are positive delivery, absence of annoyance to customers, and the additional privacy obtained by enclosing the bills. In addition, a factor of economy enters due to the elimination of a large number of "no bill received" complaints. One utility has reduced this type of complaint 60 per cent by changing from hand delivery to mail delivery. Another advantage lies in the immediate return of unclaimed bills of customers who have moved. Where customers are out of town during the summer months, and leave a mailing address, the bills are automatically forwarded to them.

Delivery by Specialized Bill Deliverers or Meter Readers

Where the plan of delivering the bills is employed, it is usually applied only to the metropolitan areas, the bills for the outlying, scattered districts being mailed. The reason for this variation is that where the distances between houses are great, delivery by hand ceases to be economical.

The plan of hand delivery of service bills is based on economy and public relations. The unit cost of hand delivery in well populated areas is less than half the mailing cost. While the labor cost of delivery is from 6c. to 8c. per bill, the mailing cost is 2c. per bill plus the costs of folding the bills, inserting them in envelopes, and stamping. One company is mailing postal card bills, but its experience has been unsatisfactory and enclosed bills are soon to be substituted.

Light and power companies frequently have problems of policy or procedure on customer relations matters which are difficult of solution. It is the function of the Customer Relations Committee to aid companies in solving such problems. The committee will be pleased to receive requests for opinions of its members and will also endeavor to obtain the experience of operating companies for your guidance.

Address such requests direct to the chairman.

H. T. East, *Chairman,*
Customer Relations
Committee,
1427 Edison Building,
Chicago, Illinois.

It is claimed by the companies using hand delivery methods that economy may be obtained without injuring public relations. By the selection of dependable, and efficient employees for delivery, and the introduction of penalties for errors and failure to deliver bills according to instructions, a higher degree of customer satisfaction can be obtained than that resulting from mailing the bills. Very few "no bill received" complaints are experienced, and customers are well satisfied with the plan. In the hand delivery of bills, two variations are employed: delivery by a specialized group of bill deliverers, and delivery by meter readers who intersperse this function throughout the month with the reading operation. The former plan may prove more economical since specialization tends to produce efficiency, and since employees for such a simple operation can be often obtained at a lower wage. For the latter plan, however, it may be said that the results obtained through the use of older, more experienced, and more dependable men, warrant the slight additional cost.

Qualifications of Bill Deliverers

The men selected for this work should be mature, neat appearing, and have a sense of responsibility. They should be intelligent and dependable. A person bearing these qualifications will gain the confidence and respect of the customers and will aid in improving public relations.

Incentives for Efficient Bill Delivery

All wage plans should consider means of providing incentives for efficient and positive bill delivery. This is usually accomplished by profit sharing plans for the production of correct work, and penalties for incorrect work. This bonus may take the form of an increment to be added to the wage, or the incentive may be the wage itself as determined by the previous month's production. The incentive should do much toward improving the efficiency of the men and reducing the number of no bill complaints.

Among the plans of payment to increase the efficiency of bill delivery, two types will be explained.

1. The output in bills correctly delivered per month determines the hourly rate of wage.
2. A standard time for delivering a certain number of bills is obtained by time study, and savings accomplished by employes are shared with them on a percentage basis.

Place of Delivery

Where the bill delivery plan is followed, bills are usually placed in envelopes before being delivered to customers' premises. Some companies insist on handing bills to an individual on the premises. Where this is not possible, the bill is returned to the office and mailed.

Returned Mail and Inability to Deliver Bills

When bills are returned by the postal authorities they are turned over to the collection division for investigation and delivery to the customer. The bill should be in the customer's possession for a reasonable length of time before collection action is started. In the attempt to locate customers, information can be obtained from cartage companies, the post office, credit bureaus, neighbors, etc.

Relation of Reading, Delivery, and Discount Dates

Utilities should maintain, as far as possible, the same schedule in all three operations from month to month. If the period varies between any two operations the variation forms a potential source of complaint. In maintaining the same schedule, the customer gets in the habit of budgeting his expenses, whereas variations will cause requests for special dates. Maintaining a standardized schedule instills confidence in a customer who will then be assured of bills for a full month's service each month.

Conclusion

In making a decision as to the best plan of bill delivery, the important factors to be considered are public relations and cost. Character of territory, density of population, and number of customers will determine whether or not positive delivery is best accomplished under one plan or the other. Where facilities are not provided for the proper education of employees, from a public relations standpoint, or such an educational program does not appear economical, the plan of mailing bills will undoubtedly be the best. Where facilities for employees' education are provided, and the help is available, many of the benefits of the mail delivery can still be obtained by the less costly hand delivery.

National Analysis of Bill Delivery Practices

THE foregoing article is a résumé of policies and practices employed by companies in the Great Lakes Division. It was prepared and published by the Customer Relations Committee, Great Lakes Division, N. E. L. A. Since the findings showed that practices varied widely, the National Committee decided to make an investigation of the bill delivery policies in other sections of the country where the governing factors might differ because of character of population, prevailing wage scales, density of population, and prompt payment discount policies.

Reports were obtained from thirty-five representative gas and electric companies in the United States and Canada. For the most part these were large companies, although some operated in strictly metropolitan areas while others served larger territories with scattered populations.

Analysis of the thirty-five reports received showed that approximately 60 per cent of all bills are delivered by United States mail. It is interesting to note that practically every company which reported had at one time or another tried the hand delivery system, and nearly all admit having experienced difficulties, such as failure to deliver, leaving bill at wrong address, bills thrown on porch or hall floor, objections of postal authorities, and claim of customers that bill was not received. Practically all of the companies now using United States mails have discarded the hand delivery in favor of mail delivery after carefully analyzing the advantages of the two plans and reaching the conclusion that the admitted greater cost of mail delivery is justified by increased efficiency, added dignity and other advantages.

Another consideration frequently mentioned was the fact that where hand delivery is used it is necessary to supplement it by mail delivery to a certain percentage of customers due to customer's preference, isolated locations, type of mail box, or other reason. It is, therefore, necessary to make provision for mailing bills to a portion of the customers (this varied from 5 to 50 per cent) necessitating mailing facilities and personnel. Many companies apparently felt that since most of their bills must be mailed, it would be better to establish a uniform policy and mail all bills, since in no instance would it be possible to deliver 100 per cent of the monthly statements by hand.

Many companies, among them some of the larger ones, print their bills on standard United States postal cards which cost one cent for paper and postage. One end of the card is used as a stub, being perforated or marked for chopping, and this stub is retained by the company for accounting purposes after the bill is paid. Where the postal card is used care must be taken to avoid showing arrears, or at least indicating arrears as such, since postal regulations forbid any information on the postal cards which might embarrass the recipient. One company which uses postal cards exclusively incloses them in an envelope when they carry arrears. The principal argument in favor of postal cards is that it provides the advantages of mail delivery at a cost which compares very favorably with hand delivery. Objections offered to this form are the small amount of space available for the bill and lack of dignity. Notwithstanding these objections, this method of billing and bill delivery is successfully employed by some of the largest and most progressive companies who report they are entirely satisfied with the plan and would not consider any change.

Many of the companies which use mail delivery claim one of its advantages to be the opportunity provided for sending company notices, advertising matter, and other communications in the same envelope. This plan can also be used where hand delivery methods are employed.

Seven of the reporting companies using the hand delivery method do not inclose their bills in envelopes, thus effecting a further economy. The majority, however, feel that bills should be inclosed in envelopes for protection and to insure privacy.

Any analysis of the bill delivery policies of companies throughout the United States and Canada must take into consideration the conditions which would naturally influence the selection of the plan. In certain sections, notably the Northeastern States, rate schedules do not contain any prompt payment discount provisions. Many companies in this territory deliver bills by hand and attempt collection of the bills at time of delivery. Thus the men delivering bills are in one sense collectors. This practice is born of the desire to effect early collection. The companies with prompt payment discounts do not have this problem.

The prevailing wage scale for employees who deliver bills also has an important bearing upon the decision as to the plan to adopt. Some reporting companies pay their bill deliverers three times more than other companies. Since the principal reason for hand delivery is its economy, the cost of hand delivery due to wage scales must, of course, be carefully considered, and companies operating in territories where the prevailing rates of pay for such help are low naturally have a greater incentive to use hand delivery methods since the saving effected over mail delivery would be correspondingly greater.

Post Office Requirements

One of the principal difficulties experienced in hand deliveries is the objection raised by postal authorities to placing bills in customers' mail boxes. This question has confronted utility companies all over the country. Inquiries made at the Post Office Department in Washington bring forth the information that the Department has issued instructions to the effect that postmasters should take steps to discourage the use of mail receptacles for other material than United States mail. This is an instruction, no legislation having as yet been passed on the subject, except as regards the use of rural mail boxes. In some cities the postal authorities have taken active steps to forbid the use of mail boxes for public utility bills. In other cities the postmasters have permitted the use of boxes without objection with the understanding that the practice was not to interfere with the use of the boxes as a receptacle for the United States mail. In the larger cities many of the newer apartments are equipped with mail boxes which do not have an opening, the postman being provided with a key with which to open boxes when mail is delivered. Where such boxes are used some other delivery method must, of course, be employed.

Although the objections of the postal authorities have been successfully met in most instances, this is a phase of the situation which deserves careful consideration when considering any change in policy.

Conclusion

A study and analysis of the bill delivery methods employed in various sections of the country discloses a wide variation in practice. Each plan has its opponents and proponents. Each has its advantages and its disadvantages. It is significant to note that although practically every company has at some time or another delivered mail by hand, the majority of bills sent out by the industry is now carried by United States mail. The trend is decidedly in this direction. On the other hand, considerable saving is effected by hand delivery, and if this work is done by capable employees under careful supervision, many of the disadvantages can be avoided.

Our investigations prove that there are many elements to be considered upon a company bill delivery policy, and it is recommended that each company consider its present policy after giving consideration to the experience of other companies in the matter.

Women's Opportunity

(*Continued from page* 776)

by others. The big problem for the leaders of our industry is how to create an environment so that employees will become so interested in their work that their main thoughts are not going to be for quitting time and pay day.

Pride is a stepping stone to success in any venture, and one with ambition is easily led to take pride in his work.

Some of us are taking the work of the Women's Committee seriously and incorporating it into our daily work. This work we have repeatedly likened to that of builders, and since we laid the corner-stone at this place two years ago we have gone a long way in the building of this electric structure. Longfellow places this type of work way at the head of the list in its innate value when he says, "To build, to build! That is the noblest of all arts. Painting and sculpture are but images, are merely shadows cast by outward things on stone or canvas, having in themselves no separate existence. Architecture, existing in itself and not in seeming a something it is not, surpasses them as substance shadow."

Living and working to build up this electrical structure is bound to react on the workers, for we are dealing with creative energy, with the very stuff of which great ages and great empires are made. We are now living in an age when we are taking force from the elements and turning it to the good of man. This thought gives us great delight, and some day some poet may tell the epic of this Electrical Structure upon the building of which we of today are working.

Oh, to be alive in such an age
When progress rides her chariots high,
And on the borders of the sky
The signals of the century
Proclaim the things that are to be—
The rise of woman to her place,
The coming of a nobler race.
Give thanks with all thy flaming heart—
Crave but to have in it a part.
Give thanks and clasp thy heritage—
To be alive in such an age!

The Domestic Load

(*Continued from page* 782)

I am convinced that a careful analysis would reveal that there are no more electrical accidents and electrical fires in those areas using the standard electric code as a guide than are reported in the sections which supplement the code with special rules and regulations demanding unusually strict requirements.

Please understand that we are not recommending that the bars of safety be let down. The power companies are the ones to bear the blame when accidents occur and they will not countenance any careless practice. They do not favor and will not endorse any sub-standard materials or appliances. They do not want their service to pass through bad lamp cord or poorly designed bell-transformers. There is a life-long contact with the consumer and selfishness alone would dictate that the standards of service be high.

Years of experience have shown us that our original traffic rules were too severe and they have been amended with no apparent increase in hazard. Football rules are revised annually, with the object of making a game more enjoyable to the grandstand; that is, to the ultimate consumer. The automobile industry and the sporting fraternity recognize the merit of our text, "Thou shalt neither vex a stranger, nor oppress him."

Every word of this paper has been written with this text in mind. I am not fretting about the electrical contractor; I am not complaining about our competitors; I am not scolding the inspectors. All that I have tried to do is to speak a word in behalf of the consumer of electricity, who wants to use this modern servant and who considers you his counsellor and aid in securing maximum protection at minimum cost.

ELECTRICAL RESEARCH STATISTICS

December, 1929

Issued Monthly by Statistical Research Department of the National Electric Light Association
420 Lexington Ave., New York, N. Y.

H. A. Snow, *Chairman, Statistics Committee, Accounting National Section*
Wm. M. Carpenter, *Economist*

H. S. Bennion, *Director of Engineering, N. E. L. A.*
Merle Rainey, *Statistician*

The National Electric Light Association, a voluntary organization of companies and individuals affiliated with or interested in the electric light and power industry, organized to advance the art and science of the production, distribution, and use of electrical energy for public service.

The Association maintains a Statistical Research organization which collects, interprets, and makes available basic statistical information on the electric light and power industry. The publications and services of this department are available to all those interested, on request.

Current Statistics of the Electric Light and Power Industry

(*As of September* 30, 1929)

The data here presented are for the total (100 per cent) electric light and power industry and are based on monthly reports received from some 400 companies, representing over 86 per cent of the industry.

	AUGUST		Per Cent Increase	SEPTEMBER		Per Cent Increase
DURING MONTHS OF AUGUST AND SEPT.	1929	1928		1929	1928	
*Kw-hr. generated (net)	7,769,016,000	7,029,816,000	+10.5	7,604,120,000	6,828,974,000	+11.4
Add—energy imported from Canada and purchased from outside the Electric Light & Power Industry	209,000,000	209,000,000		199,000,000	178,000,000	+11.8
Less—energy used in company departments	190,000,000	209,000,000	− 9.1	194,000,000	196,000,000	− 1.0
Total energy for distribution (kw-hr.)	7,788,016,000	7,029,816,000	+10.7	7,609,120,000	6,810,974,000	+11.7
Sales of energy in kw-hr. for:						
Farm service (not involving irrigation)**	8,726,000			162,069,000		
Farm service (involving irrigation)**	194,376,000			10,158,000		
Domestic service	634,636,000	532,398,000	+19.2	714,159,000	607,614,000	+17.5
Commercial service:						
Small light and power	1,043,589,000	871,752,000	+19.7	1,073,886,000	928,702,000	+15.6
Large light and power	4,162,965,000	3,755,076,000	+10.9	4,144,097,000	3,697,957,000	+12.0
Railways and railroads (motive power)	392,087,000	399,340,000	− 2.9	382,141,000	392,035,000	− 2.5
Other sales to ultimate consumers	154,739,000	139,250,000	+ 6.6	170,837,000	151,666,000	+12.6
Total sales to ultimate consumers (kw-hr.)	6,388,016,000	5,697,816,000	+12.1	6,485,120,000	5,777,974,000	+12.2
Total revenue	$163,007,000	$149,303,000	+ 9.2	$171,135,000	$156,236,000	+ 9.5
Revenues from sales for resales and miscellaneous (included above)	$11,485,000	$10,602,000	+ 8.3	$11,012,000	$10,062,000	+ 9.4
DURING THE TWELVE MONTHS ENDING	AUG. 31, 1929			SEPT. 30, 1929		
*Kw-hr. generated (net)	88,622,772,000	(Comparable data here will commence Jan. 1, 1930)	....	89,387,918,000	(Comparable data here will commence Jan. 1, 1930)	
Add—imports from Canada and purchases from outside the Electric Light & Power Industry	2,180,917,000		....	2,227,000,000		
Less—energy used in company departments	2,540,000,000			2,465,000,000		
Total energy distribution	88,263,689,000	....	....	89,149,918,000	....	....
New generating capacity installed (kw.)		....	....	***1,389,000	....	....
Number of new customers added:						
Farm customers	832,000	....	....	812,000	....	....
Domestic customers		....	....		....	....
Commercial customers	77,000	....	....	79,000	....	....
Others	2,000	....	....	1,000	....	....
Total customers added	911,000	....	....	892,000	....	....
Important factors:						
Percent of energy generated by waterpower	37.2	....	....	36.7	....	
*Average pounds of coal per kw-hr. generated	1.68	....	....	1.68	....	....
Domestic service (residential use):						
Average annual consumption per customer (kw-hr.)	484	....	....	487	....	....
Average revenue per kw-hr.	6.33c.	....	....	6.30c.	....	....

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*By courtesy of the U. S. Geological Survey with deductions for plants not considered electric light and power enterprises.
**As reported by 178 companies only, included in figures below.
***Increase first nine months.

Basic Information on the Electric Light and Power Industry

As of September 30, 1929; (100% *of the Industry*)

1. Value of plant and equipment (estimated)	$10,450,000,000*
2. Total generating capacity in kw	28,829,000
Steam	20,939,000
Waterpower	7,578,000
Internal combustion	312,000
3. Total number of customers served	23,878,000
Farm customers (as reported by 178 companies only)**	(236,000)
Domestic customers	19,673,000
Commercial customers	
Small light and power	3,613,000
Large light and power	559,000
Others	33,000
4. Population in electrically lighted homes	82,600,000
5. Percentage of homes which are served with electricity	68
6. Miles of transmission lines (11,000 volts and above) (circuit miles)	159,000*

* Subject to revision. ** Included below.

Operations of the Electric Light and Power Industry During September, 1929

FOLLOWING two months of unusual industrial activity in July and August, the statistical summary of the output of electricity in September shows a small relative decline when allowances are made for the seasonal expansion which should normally take place at this time. Business during September continued, nevertheless, at a very high level, and the sales of industrial power for the first nine months of 1929 reached a record total of 34,250,000,000 kw-hr., an increase of 4,120,000,000 kw-hr., or 13½ per cent over the corresponding period of last year.

These increased requirements of energy by the nation's factories, together with the continuance of unusually dry weather, have placed a heavy demand upon the steam plants of the interconnected systems. In September, the generation of electricity by water power was only 31 per cent of the total output. This is the lowest ratio since the dry weather period of October, 1925, and compares with a ratio of 43 per cent in May, and 38 per cent in September, 1928. During the month, the total hydro-electric production was 12½ per cent below that of August and 12 per cent below that of September, 1928.

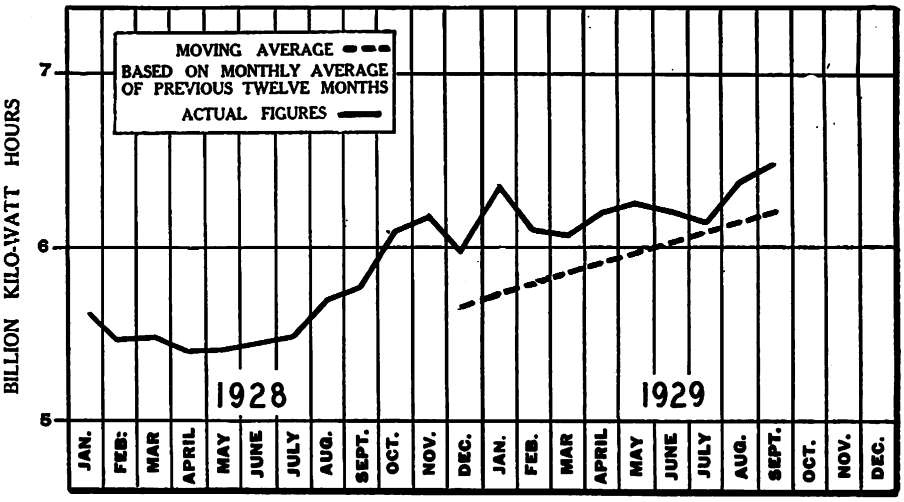
As a result, the capacity factor of the steam plants apparently reached the highest figure since the disturbed years of the war-time period. In September, 1929, the steam stations operated at approximately 35 per cent of rated capacity and the waterpower plants at 44 per cent, as compared with an average of 29 per cent for steam and 52 per cent for waterpower for the entire year of 1928.

Large Increase in Domestic Service

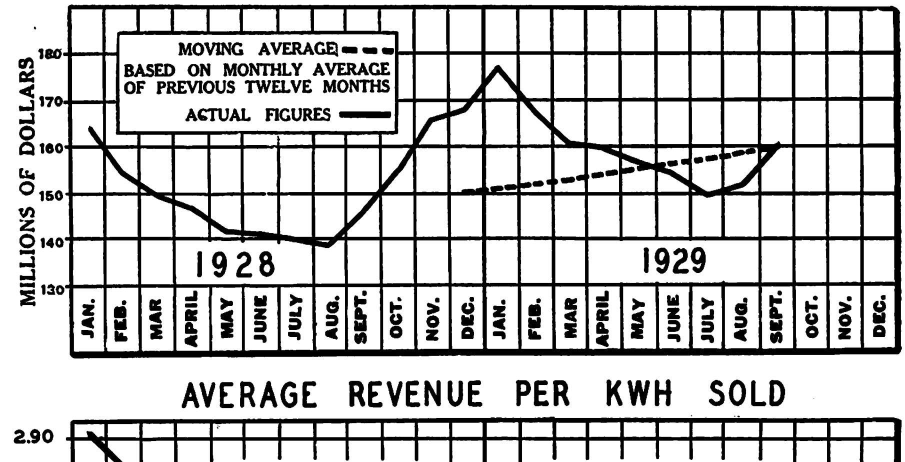
Coincidently with the growing demands of industry, the use of electricity in the home has, this year, shown a remarkable increase. For the first nine months of 1929 total sales of domestic service were 6,971,000,000 kw-hr., an increase of 971,000,000 kw-hr., or 16 per cent, over the figure for the corresponding period of last year. At this rate of increase (with the reservation that the influence of the recent stock market collapse upon the purchasing habits of the domestic consumer and therefore upon the continuance of this high rate of use has still to be evaluated) the total use of domestic electricity during the entire year 1929 should approximate 9,800,000,000 kw-hr. This figure for domestic service alone is greater than all sales of electricity twenty years ago.

The course of sales, revenues and average prices of electricity sold to all consumers is shown in the diagram where the solid line represents actual figures for each month and the dotted line the average for the twelve months' period. For the year ending with December, 1928, the average revenue per kw-hr. sold was 2.64 cents; for the year ending with September, 1929, it stood at 2.57 cents—a decrease of 2½ per cent.

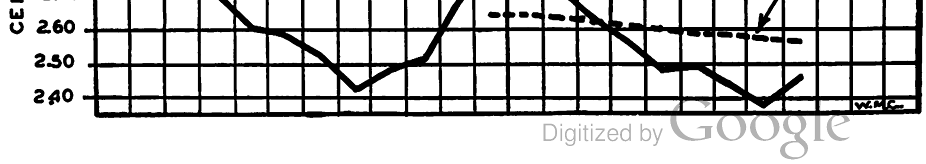
SALES TO ULTIMATE CONSUMERS



REVENUES FROM ULTIMATE CONSUMERS



AVERAGE REVENUE PER KWH SOLD



ACCOUNTING SECTION

W. R. Emerson, *Chairman* **Fred W. Herbert**, *Director, Accounting Section, N. E. L. A.*

Group Meeting Accounting National Section

By Fred W. Herbert

The group meeting, held at Chicago, Oct. 24-26, demonstrated that the Accounting National Section is doing its part in meeting all the requirements of the industry and is endeavoring to keep pace and possibly just a lap ahead of the requirements. This particular meeting was probably the largest and most constructive group meeting ever held by the section.

The morning of the first day of the meeting was devoted to a get-together meeting for the informal discussion of section and individual company accounting problems. This meeting was followed by a luncheon which many members of staffs of the operating companies in Chicago attended. About two hundred and fifty were present.

Following the luncheon a session was held in an adjoining meeting room. An interesting talk was made by Henry Swift Ives, special counsel of the Association of Casualty and Surety Executives, on the subject of "Industrial Accord." Mr. Ives stressed particularly the necessity of closer cooperation of the insurance field with the public utilities and stated that it was up to the accountants to bring this about. In the course of his address, Mr. Ives said: "Education, in the academic sense, has made tremendous, and sometimes even frantic efforts to broaden the horizon of the citizen so that he may keep pace with the achievements and aspirations of his fellows and so that his fellows may keep pace with his aspirations and achievements. But education which ends with a diploma is not enough. The uncultured have no monoply upon the static mind. The tide of events is rushing onward too furiously to permit of any letup in the acquirement of knowledge, especially such knowledge as has to do with economic and social progress and well-being. If this tide is to be properly controlled and guided toward the destiny of our hopes and dreams it must be controlled and guided by the aggressiveness of intelligence.

". . . Such perceptions of the economic and social order may only be found among broad visioned men who have carried their education beyond the diploma stage and who have studied the processes not only of the enterprises in which they are engaged but also have given attention to other enterprises to which their relationship is direct and constant.

". . . I often have said that a primary course in insurance economics is the greatest educational need of the average American business man, and you probably would counter with the assertion that a primary course in public utility economics is his greatest need. We both probably are stating truth and I am prepared to agree with you if you will agree with me."

Mr. Ives was followed by William H. Hodge of the Byllesby Engineering and Management Corporation who spoke on the subject of customer ownership. Although customer ownership has not been as active in the past two or three years, the principle of customer ownership when companies need further financing is as stable today as when it was originally instituted. Mr. Hodge also gave some helpful suggestions on the accountants' duties in relation to the financial structure of public utilities.

Paul S. Clapp, managing director, N. E. L. A. outlined some of the work of the other sections of the association and told how the accountants could add materially to the work of the association by coordinated action. He drew a beautiful word picture of the meeting at Dearborn in celebration of Light's Golden Jubilee.

Through the courtesy of George F. Oxley, director, Department of Public Information, N. E. L. A. Headquarters, there were shown a number of talking moving pictures of the Atlantic City Convention last June, with movietone talks by prominent members of the Association.

Through the courtesy of B. F. McGuire of the Commonwealth Edison Company, Chicago, arrangements were made for a bus ride over the City of Chicago, and an inspection trip to the stations of the Commonwealth Edison Company during the afternoon. This was an innovation which proved very enjoyable to those who took advantage of this bus ride.

The second day was devoted to individual meetings of the several standing committees of the section, the time being given over to the discussion and outlining of plans for reports and other activities of the section. These meetings were visited by the chairman, vice-chairman and a number of invited guests, who entered fully into the discussions. All the committees are fully organized, both as to national and geographic divisions and it is anticipated that a number of helpful serial reports will be issued by the several committees during this administrative year.

The Executive Committee of the Accounting National Section met on the third day. At this meeting reports were made by each of the chairmen of the standing committees and also by the chairman of each of the geographic division accounting sections. Reports from the geographic division representatives indicated that the divisions are fully organized and are doing much constructive work. A full representation of the accounting section from the geographic divisions at this meeting showed conclusively that a great interest has been stimulated in the geographic divisions in the work of the accounting section, and, with this increased activity, it cannot help but show greater results, inasmuch as the National Section is dependent largely on the work of the geographic divisions.

The Exhibit Committee, organized this year as a standing committee, reported that it is collecting forms and statistical data which will be very helpful to the geographic divisions, and that it is prepared to furnish charts, forms, and exhibit material to any geographic division which might desire to make a display at a convention.

The next group meeting of the Accounting National Section will be held at Detroit, Feb. 24, 25 and 26, 1930. Notice of this meeting will be sent from headquarters shortly. This will be the last group meeting of the accounting section before the annual meeting in June. The first two days of this meeting will be given over to meetings of the different committees and the executive committee. The third day will be devoted entirely to inspection of the plants in Detroit which manufacture mechanical appliances for billing, accounts payable, etc. Arrangements will be made through these manufacturers by which all members of the Accounting Section who desire to wait over for the third day can get full details on all office mechanical devices and an opportunity will be given also to visit Dearborn, the scene of Light's Golden Jubilee celebration.

A number of committee reports are now in press and a number in preparation, and will be available to the membership shortly.

A new committee to be called the Advisory Council is now in process of formation, the scope and membership to be announced in a short time by Chairman Emerson.

COMMERCIAL SECTION

MARSHALL E. SAMPSELL, *Chairman* C. E. GREENWOOD, *Commercial Director, N. E. L. A.*

Commercial National Section Committee Programs Formulated

THE prosperity of the country is now uppermost in the minds of everyone. The level of business progress is directly reflected in the sales and revenue of the light and power company, and perhaps the commercial executives have more to think about right now than other groups. Since transformer loadings are a fair barometer of prosperous industry, commercial men have the obligation of keeping those loadings at capacity.

"More Kilowatt Hours at Better Load Factor" is the slogan under which Chairman Marshall E. Sampsell is advancing the work of our Section this year. Every man in the commercial field can sense the need of vigorous selling of electric service in the coming months, new power and heat applications in commerce and industry, and the adoption of more electric servants in the home. These were the underlying thoughts which governed the committee chairmen in the development of their programs for this year.

F. D. Pembleton, chairman of the Merchandising Bureau, held a group meeting of the committees on Oct. 10, and M. E. Skinner, chairman of the Lighting Bureau, held a group meeting of the Lighting Bureau on Oct. 24 and 25. Meetings were called at the Westinghouse Lighting Institute through courtesy of Ralph Neumuller, director. A brief resume of crystallized discussion and proposed action follows.

Merchandise Sales Committee

With the purpose of placing merited stress on the domestic load, Chairman C. L. Harold has directed committee action into channels of research and promotion. The essential of complete knowledge of the market through local survey as a basis on which to build sales plans is now recognized. The committee is securing information on the surveys already made and recommending standard practise in investigation work. Through N. E. L. A. Headquarters the benefit of advice of both government and university agencies will be secured. Other committees are studying methods of approach to the home owner, and to the speculative builder, and promotion of the sale of complete electric home equipment to be financed in the mortgage of the new home.

The scope of activity of the Oil Burner Committee has been changed to include other house heating methods such as the hot water storage system and the automatic domestic stoker for small size coal.

The Farm Equipment Subcommittee is continuing to expand its field of endeavor to industrialize the farm and farmstead.

The interests of the trade and the advancement of dealer cooperative methods, sales stimulation through contests, and the establishment of radio selling by the power company are other important efforts of divisional committees.

Range Committee.

There will be ready for distribution about the time of publication of this issue of the N. E. L. A. BULLETIN a sales report on electric ranges representing the work of the committee. Greater interest by the "combination" companies, promulgation of uniform sales methods and circulation of promotional material, better range wiring methods, a study of the handicaps to electric range promotion, are important subjects that Chairman Coupal is taking under committee advisement. The problem of "servicing" ranges is to have more considerate attention.

Refrigeration Committee

The results of the National Food Preservation Program are being carefully reviewed. Chairman Dunn is highly pleased with the accomplishment of the National Food Preservation Council in executing the program of last year's committee. An exhaustive study of ways and means of taking full advantage of the momentum now gained through educational work, and building a plan of continuation is before the committee at this time.

Water Heating Committee

The progress being made by the Water Heating Committee was reflected in its meeting. Chairman N. T. Wilcox arranged for A. B. Morgan of the Headquarters' staff to give a brief review of his recent investigation which covered the greater part of the United States. Mr. Morgan reported a keen interest in water heating throughout the country. His trip was most profitable from a standpoint of determining the variation in the requirements of the different sections of the country, as well as from the large amount of data collected. The committee now has recent test data, aside from that published in the technical magazines, from Augusta, Me., Birmingham, Ala., Buffalo, N. Y., Cedar Rapids, Iowa, Dayton, Ohio, Detroit, Mich., Jackson, Mich., Minneapolis, Minn., Pueblo, Col., and San Diego, Cal. This data is supplemented by valuable tests and information from other sources. Data has been promised from as many more places. In accord with the national program, tests are now being conducted by the Potomac Edison Company and the Puget Sound Power and Light Company. The Seattle tests include several groups of heaters under both Summer and Winter conditions.

The program for this year's activities, which was accepted by the committee, includes the purchase of ninety Recording Ammeters to be used in obtaining the diversity of approximately that number of heaters in the Birmingham district, Miami, Florida, and possibly one other point in the Southeast, as well as in Rockford, Ill. The results of these tests on various types and sizes of heaters, together with the data already at hand, will be used as the basis for a report which, it is now contemplated, will be issued early in the summer of 1930. It was decided to hold the proposal for laboratory tests in abeyance until after the field tests had been made so that the results from these tests might be used as a background for determining the necessary laboratory measurements. The Southeastern division offered to cooperate with the national committee in order to expedite the work. This offer was accepted and the test program will shortly be under way in the Southeast.

Commercial and Industrial Lighting Committee

Men in the commercial lighting field have been impressed for the past few years with the need of definite action to overcome the lack of interest of the architectural profession in wiring needs of commercial and industrial buildings. On some of the newer buildings several thousand dollars expenditure has been required for more circuits before occupancy. Many of the power companies are now offering a lighting service, and attempt will be made to familiarize the architects with this service and also encourage other power companies to get into line.

The committee hopes to develop a code of ethics for the personnel, and suggestions for its practical application in establishing architectural contact. National conferences dealing with architectural phases of the wiring and lighting work of the Lighting Service Departments are planned, and the promotion of similar local schools to be held in geographic divisions, together with the development of model programs for these schools. There were two conducted last year by the Edison, and the National Lamp Works, for the training of lighting service men in their architectural relations. The courses will be improved and the work broadened.

The committee calls particular attention to these national conferences on architectural contact and on wiring phases of lighting bureau work. One will be held in Chicago and one in the East, probably in New York City, definite dates to be announced later.

The "Specification Paragraphs" of the committee have been completed and distributed.

Home Lighting Committee

There is now in preparation a course in home lighting which, it is suggested, should be added to the curriculum of domestic science schools in which the Illuminating Engineering Society will collaborate. The committee senses the need of a coordinated national activity to promote better lighting in the home and the use of better fixtures. A booklet on home lighting to be used in quantities for distribution by power companies is in contemplation.

Electrical Advertising Committee

The fundamental need of the industry is a Model Sign Ordinance and the Electrical Advertising Committee has completed one which has been reviewed for its legal aspects and has been accepted. It is hoped that it will be adopted by interested organizations and will be promulgated.

An important consideration is the organization of more schools on electrical advertising throughout the geographic divisions. The national schools have been well attended, but it is realized that the sectional schools will reach a greater number of men engaged in selling electric signs. A uniform program has been developed which will simplify the work of organization and operation of these sectional schools.

Street and Highway Lighting Committee

A comprehensive program is planned by the Street and Highway Lighting Committee with the development of six permanent sales reports to be kept up to date by periodic revisions. One report is to include compilation of street lighting installation data, comparing costs in respect to population of the city, length of installation in miles, spacing, lamp sizes of units, and other factors of importance. A second report will include compilation of data with special reference to enabling acts and legislation now in effect in various States influencing the method of installation of lights along State, county, township and village highways. A third report will contain information on the lighting of outdoor recreation centers such as football fields, tennis courts, etc. A fourth will be on aviation lighting. A fifth will contain information on street lighting sales methods of public utilities and manufacturers, and cooperation between utilities and manufacturers in promoting street lighting. Flood lighting of building exteriors and the design of flood lighting systems is included in committee activity.

Since an early completion of these reports is anticipated, there will be available to the industry some valuable helps in building the street lighting load.

Electric Truck Committee

A meeting of the Electric Truck Committee, Commercial National Section, was held at the Westinghouse Lighting Institute, New York, Oct. 31. The committee plans two major activities for this administrative year. An electric truck school will be held in San Francisco, just prior to the N. E. L. A. Convention in June, to acquaint power salesmen with facts regarding electric street and industrial trucks. An electric street and industrial truck advertising program also is being undertaken. An interesting series of advertising folders, pertaining to the use of electric trucks, is now being formulated by Dana H. Howard, advertising manager of the Commonwealth Edison Company.

It is proposed to carry out the advertising program in connection with a direct mail campaign being conducted by the Industrial Truck Association in cooperation with electric light and power companies, which is meeting with an encouraging response.

There is to be a group meeting of the Power Bureau on Dec. 10 and 11 at the Westinghouse Lighting Institute, New York City, when all the committees of that bureau will report progress on the programs that have been outlined for the administrative year.

Chairman Marshall E. Sampsell has called an Executive Committee Meeting of the Commercial National Section for Jan. 23, 1930, at the Edison Building, 72 West Adams Street, Chicago.

C. E. G.

$1,000 Prize for Electrical Advertising Promotion Again Offered

AN annual award of $1,000 in cash to the individual and a gold medal to the company making the greatest joint contribution to the promotion of electrical advertising has been made a permanent feature in the industry, according to W. J. Moore, supervisor, Electrical Advertising Section of the Society For Electrical Development.

The award, which was established by the Federal Electric Company of Chicago, was won in the opening competition by the Edison Electric Illuminating Company of Boston and presented to it by Marshall E. Sampsell, chairman, Commercial National Section of the N. E. L. A. C. L. Edgar, president of the Boston Edison Company, received the medal on behalf of his company and R. B. Brown of the Illuminating Engineering Division of that company was presented the cash award.

With announcement that the award will be a permanent feature in the industry, new attention was drawn not only to the Boston plan for developing sales, but also to the load possibilities of electric sign development where the activity is undertaken with a definite plan of promotion.

The plan and exhibits of the Boston Edison Company disclose that in addition to bringing in a revenue of $135,000 to the Edison Company, the campaign resulted in a gross business to the Boston sign trade of $292,500. Among other results obtained were the following: 1300 new signs sold; 1200 kilowatts connected; 900 old signs reconditioned; 400 time clocks sold; 1200 flashers sold; 20,000 color caps sold; 11,00 old signs relamped; 375 business time clocks rented; 350 maintenance contracts taken and 300 new maintenance customers acquired.

Writing of this successful campaign, which took into consideration nearly every form of market promotion, Mr. Edgar stated:

> "The promotion of electrical advertising secures two important results which should not be overlooked by the electric service company. First, from the consumers' standpoint it leads to increased prosperity by reason of its advertising value. Second, from the utilities' standpoint it represents desirable load because of its long-burning, off-peak characteristics.
>
> "For several years we have encouraged the use of electrical advertising throughout our territory. The results have been grati-

(Continued on page 821)

The Industrial Heating Committee Exhibit at the National Metal Exposition

THE National Metal Exposition was held at the Cleveland Public Auditorium, Cleveland, Ohio, from September 9 to September 13, 1929. This Exposition is an annual affair and was the eleventh successive one held under the auspices of the American Society for Steel Treating.

The annual technical meetings of the American Welding Society, the Institute of Metals Division-American Institute of Mining Engineers, Iron and Steel Division of the American Society Mechanical Engineers, and the American Society for Steel Treating, were held in Cleveland during the same week.

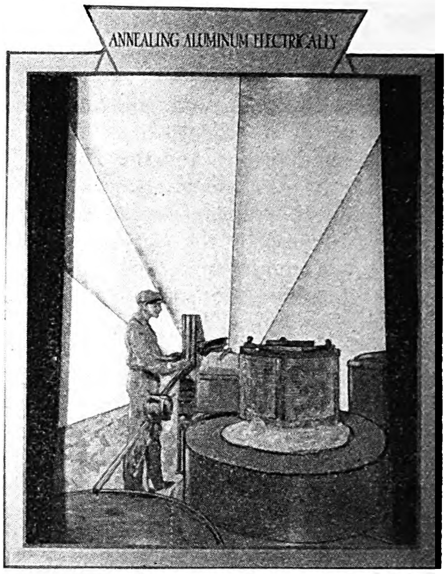
Practically every line of equipment dealing with the manufacture, heat treatment, and processing of metals was represented in the Exposition. More than 80,000 square feet in the exhibition hall was devoted to the displays of machinery and materials for this purpose. A large portion of this equipment was in operation under conditions as nearly as possible corresponding to actual service conditions.

In accordance with the practice of previous years, the Industrial Heating Committee of the Commercial National Section, N. E. L. A., contracted for 1000 square feet of floor space and held an exhibit at the Exposition.

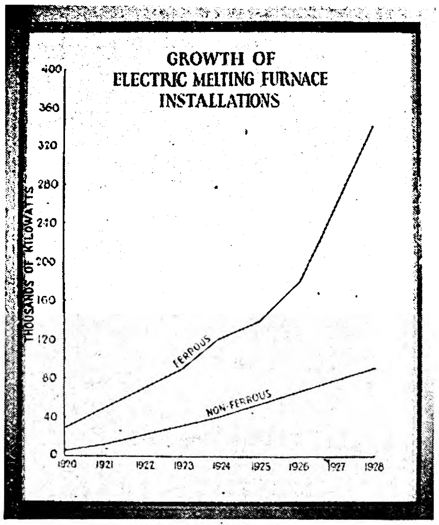
This year a decided departure was made from the type of exhibits used in the past. The exhibit was arranged and designed to attract attention by means of decorative features. The exhibit was radically different from other exhibits at the Exposition and so attracted attention by contrast. A full-length view of the booth is shown in photograph No. 1.

The entire length of the rear of the booth was made up of an ornamental display featuring in color four important applications of electric heat in the metal industry. At the left and right ends of the rear of the booth, illuminated charts were displayed showing the growth of electric heating installations over the period of years from 1920 to 1928. A close-up view of one of these charts is shown in photograph No. 2, and a close-up view of one of the pictures is shown in photograph No. 3.

The two panels containing charts were illuminated with a constant white light. The four pictures illustrating applications of electric heating were illuminated by concealed lighting. Three colors of lighting were used and arranged to work off a dimming device which gradually changed and blended the three colors. The illuminated panels were set in a draped black velour background. There was a cut-out scalloped valance along the top of the velour background. This was decorated in gold and black modern designs.



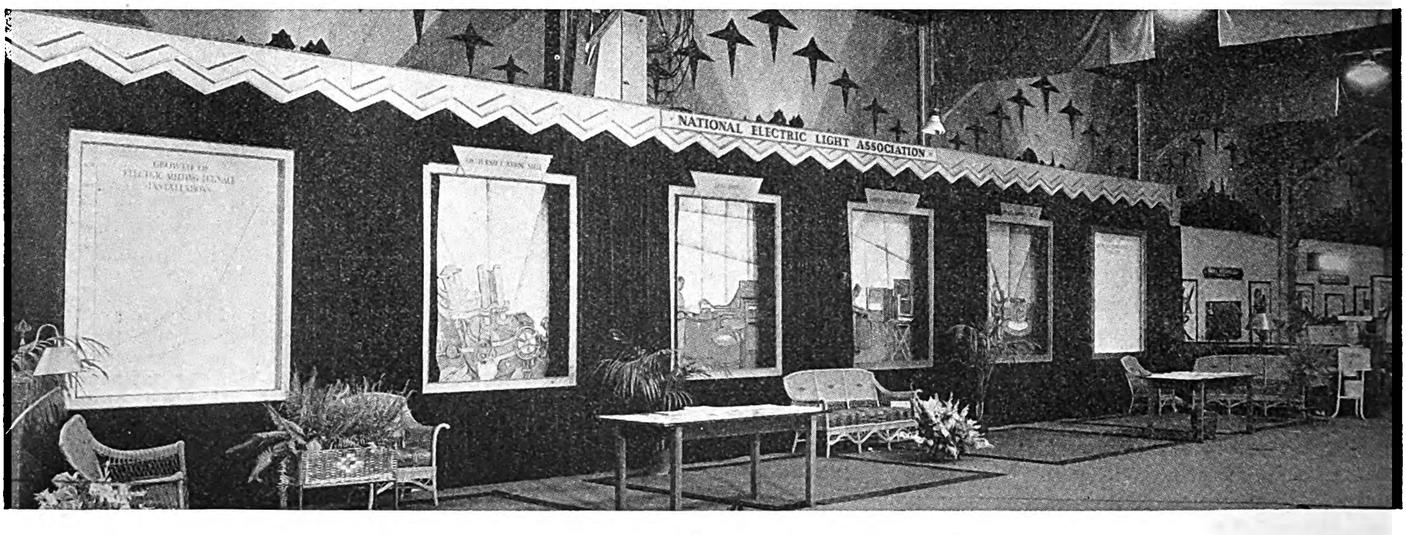
3.
Close-up View of Picture Used in Exhibit



2.
Close-up View of Chart Used in Exhibit

A large supply of literature pertaining to the use of electric heat in industry was distributed daily from the Industrial Heating Committee's booth.

The total attendance at the Exposition was 53,121. It is interesting to note that over 6000 members and guests of the cooperating societies registered. This list was composed of nearly half of the total membership of the societies and well over twice as many as have registered in previous years.



1.
Full length view of Industrial Heating Exhibit

ENGINEERING SECTION

Alex. D. Bailey, *Chairman* **H. S. Bennion**, *Director of Engineering, N. E. L. A.*

Two-Rate Metering

By The Meter Committee

Engineering National Section, N. E. L. A.

Ways and means for increasing the use of electrical energy in residences have been studied for many years. One of the recent plans has been the offering of a lower rate for energy used for certain electrical heating devices, particularly during the off-peak hours. These devices include instantaneous water heaters, room heaters, storage type water heaters, and other commercial heat applications where the demand or energy charge, or both, are less between certain hours classed as the off-peak hours. The use of these rates has presented metering and control problems which the Meter Committee, N. E. L. A. has studied with a view of giving general recommendations on the best use of available equipment.

There are various ways in which such loads may be metered, but the equipment to be used must be determined by local conditions because of the wide differences in rate application and the varying requirements of operating companies with regard to peak and off-peak periods.

European Practice

For some years, European operating companies have been using watthour meters with two-rate registers. The high rate register engages with the moving element of the meter during peak hours, usually between the hours of 7 a.m. to 12 noon, and from 1 p.m. to 7 p.m. The periods between 12 noon and 1 p.m. and from 7 p.m. to 7 a.m. are usually classed as the off-peak hours, and the energy consumed is registered on the low rate register. The change from the high rate register to the low rate register is made by means of an electromagnet and gear-shifting arrangement mounted on the meter register and actuated either by a contact clock or by an ordinary hand operated switch. Some installations are so wired that if any load other than the heater is used, the electromagnet of the two-rate register is energized and the high rate counting train is engaged with the moving element of the meter. This practice necessitates double pole lighting circuit switches and a control wire from all switches to the meter. The two-rate register is also furnished with a maximum demand indicator. With this practice, the true kilowatt-hours consumed are not shown on the meter, which may or may not be objectionable according to the accounting requirements of the individual utility.

American Practice

Some of these European two-rate meters are in use in the United States for the measurement of off-peak loads.

In certain localities where there are rates covering off-peak use of energy for water heating, house heating, etc., the following methods of metering are in successful use:

1. Two ordinary meters are installed. One is used for the heater and is billed on low-rate per kilowatt-hour. The other is used for the balance of the installation and is billed on the regular rates.
2. Two ordinary meters are installed. One meter is connected through a time switch to assure off-peak use of heater current and to prevent on-peak use, and is billed on a low rate per kilowatt-hour. The other meter is used to measure the balance of the load for billing at regular rates.
3. One ordinary meter is installed. Current limiter is used to cut off the heater automatically when the range load is on.
4. One ordinary meter is installed with a graphic demand meter which shows the use of the heater outside of hours agreed upon in contract. A penalty charge is made for such use.
5. A heater is connected at a flat rate per month, with a check demand meter installed to insure that the size of the heater is not changed.

All the American utilities who have reported to the committee are using schemes similar to those outlined above. There seems to be a general feeling that special equipment such as demand limiters, time switches, etc., are too expensive for this class of service.

If the two-rate scheme of billing comes into extensive use there may be a demand for a meter designed particularly for measuring this class of load.

Further information on this subject will be presented by the meter committee whenever it becomes available.

Special Devices and Drainage Being Studied by Joint Subcommittee

In Inductive Coordination, as well as in many other situations, there occasionally arise problems that require a special form of treatment that would be both unnecessary and undesirable for general application. An investigation of devices of this character by the Joint Subcommittee on Development and Research brought out that drainage and neutralizing transformers for telephone circuits and filters and similar resonant devices for power circuits, give the greatest promise of practical application.

The study of special devices was assigned to Project Committee No. 8 by the Joint Subcommittee. The application of devices of this character involves an arrangement of a tuned circuit which will practically eliminate a given frequency from a circuit without seriously interfering with the normal operation of the circuit.

Sometimes direct current equipment produces one or two harmonic frequencies superimposed upon the direct current of sufficient magnitude to cause serious telephone interference. A tuned circuit consisting of condensers and reactors can be connected across the terminals of the equipment in such a manner that practically all the current of the given frequency, or frequencies, will pass through the filter and not be permitted out along the lines. Several successful applications of resonant shunts of this character have been made to both rotary converters and mercury arc rectifiers.

Another type of application of a tuned circuit is in connection with generators with grounded neutral, connected directly to transmission lines. Such generators sometimes have triple harmonic voltages, which are of such a magnitude as to cause serious telephone interference in existing parallels. In situations of this character, a circuit consisting of a condenser and reactor in parallel can be arranged in the neutral of the generator in such a way that it will offer high impedance for a given frequency in the voice range of the telephone system and a relatively low impedance for the fundamental frequency of the power circuit. There have been several installations of this character which have eliminated serious telephone interference from one or two triple harmonics of the generator without seriously interfering with the normal operation of the power system, or its relays.

Some consideration has also been given to the application of selective devices to telephone circuits. An ordinary telephone conversation involves the transmission of frequencies within the band from about 200 to about 3000 cycles. The removal of one or two harmonic frequencies in this range, which cause the major part of the noise, would involve also the removing of narrow bands of the transmitted speech current. Some consideration has been given to this application and it is planned to carry on sufficient work to determine its practicability, and the degree of improvement to be obtained.

The Joint Committee assigned to Project No. 11 the study of various special devices for both power and communication systems including drainage of telephone circuits. The purpose of drainage is to relieve a telephone line of voltages of such a magnitude as to seriously interfere with its use. The drainage of a telephone line involves the placing of coils between the line and ground at frequent intervals. The coils used for this purpose are arranged in such a manner that they give a high impedance between their line terminals and a low impedance to currents flowing from the two lines in parallel to ground. A drainage installation should be designed so that the voltage between any two coil points is not excessive, and furthermore, so that the effect on transmitting the telephone currents in the metallic circuit is minimized. The Project Committee has made a thorough study of the design and operation of two drainage systems on privately owned communication circuits which have been in operation for a number of years. The Project Committee has also studied characteristics of various standard coils which might be suitable for the application of drainage in given cases. One of the difficulties in connection with the application of drainage is due to the fact that a major portion of the commercial telephone systems carry direct current for telegraph or signaling superimposed upon the telephone circuits. Any means of applying drainage that is known at the present time would prevent the use of direct current in this manner on the telephone circuits.

The Project Committee has worked out the theory of drainage for a number of cases, including those in which the application would be most likely to prove desirable.

Correction

IN the November BULLETIN, page 734, in the article on the Electrical Apparatus Committee, there occurred an error relating to Fractional Horsepower Motors wherein it was stated that appliances equipped with the new motors would be generally available on Jan. 1, 1930. This date should have been June 1, 1930. The corrected item is as follows:

Fractional Horsepower Motors

It was reported that final agreement has been reached by appliance manufacturers and the light and power interests on the characteristics of single phase 110 volt motors of one-third horsepower and less. Most appliances are now equipped with motors of approved characteristics, and announcement was made that on June 1, 1930, those not now so equipped will appear on the market with motors approved under this agreement.

Prime Movers Committee Meeting

By ROGER D. DEWOLF, *Chairman*

A MEETING of the Prime Movers Committee was held in Boston, Mass., on Nov. 18 and 19, with a total attendance of 62.

C. F. Hirshfeld explained the organization and proposed activities of the Research Committee, of which he is chairman, and outlined in a general way the work which this committee proposes to carry on. W. V. A. Kemp has been appointed research secretary, and will be actively in charge of this work. Mr. Kemp plans to visit member companies and will welcome suggestions from members of the committee as to the work that the Research Committee should undertake.

Final reports were presented and referred to the Editing Committee by the following Subcommittees:

Boiler and Turbine Room Instruments
Coal and Ash Handling
Distillation Products of Coal
Power Station Betterment

Preliminary reports were presented by the following Sub-committees:

Stoker Equipment and Furnaces
High Steam Pressures
Pulverized Fuel
Boilers, Superheaters and Economizers
Condensing Equipment

On Nov. 19, at the invitation of the Stone & Webster Co., the meeting was held at the Somerset Station of the Montaup Electric Company. Automobiles were provided for taking all members from Boston to Somerset, where the plant was inspected and a buffet luncheon served by our hosts. Mr. Parks, general superintendent of the Montaup Electric Company, then gave us a brief historical outline of the origin of the company and the cooperative operation of the three companies using the output of this station.

A very interesting Round Table discussion was held at the plant in the afternoon and the committee members were then taken back to Boston or Providence, according to their transportation requirements.

The next meeting of the committee will be held in Rochester on Jan. 27 and 28, 1930.

Great Lakes Engineering Section Meeting

THE Annual Fall Meeting of the Engineering Section of the Great Lakes Division was held at the Loraine Hotel, Madison, Wis., Oct. 23 to 26, 1929. Some two hundred and fifty engineers attended the sessions which dealt with problems of engineering, construction and operation. The technical sessions were held throughout the first three days and the fourth day of the meeting was devoted to inspection trips and to sports.

The outstanding feature of the meeting was the discussion of power system stability for which papers were secured from nationally recognized authorities on the subject. Among the contributors of formal papers were Alexander D. Bailey, chairman of the Engineering National Section, Forrest Nagler, Hydraulic Engineer of the Allis-Chalmers Manufacturing Company, Robert Treat, General Electric Company; C. L. Fortescue, Westinghouse Electric and Manufacturing Company, J. H. Foote, Stevens & Wood, incorporated. Discussion was led by L. F. Hickernell, chairman of the Engineering Section of the Great Lakes Division and was participated in actively by the representatives of member companies who were present.

In addition there were reports on research activities and recent developments in the art of engineering as applied to electric utilities as well as administrative reports from the chairmen of all of the engineering committees of the Section wherein their activities for the current year were announced.

Power Group N. Y. Section, A.I.E.E. Holds First Meeting

THE first meeting of the Power Group, New York Section of the A. I. E. E. was held on Oct. 30 at the A. I. E. E. Headquarters.

The subject, "Generation and Development of Generators" was ably handled in the papers presented by H. B. Forbes of the New York Edison Company and C. M. Gilt of the Brooklyn Edison Company. The number of men who took an active part in the discussion, which followed the presentation of the papers, is indicative of the general interest taken in the meeting.

In accordance with the policy of the group, the meeting was called to order promptly at 7.30 p.m., and was adjourned about 9.15 p.m.

The next meeting of the group will be held on Dec. 9, 1929, and the subject will be "System Connections."

GEOGRAPHIC DIVISIONS and STATE ASSOCIATIONS

CANADIAN ELECTRICAL ASSOCIATION

P. S. Gregory, *President* **H. M. Lyster**, *Secretary*

Canadian News Letter

By H. M. Lyster

The organization of the Canadian Electrical Association for the current year was completed early in September and all the committees have met and laid out their programs for the year.

The Engineering and Commercial Sections have met and held group meetings, with subsequent meetings scheduled for soon after the new year. The other committees have met individually.

Following the Industrial Relations Committee Conference in Chicago and the recommendation that such a conference should be held in the various geographic divisions, a joint conference was held in Montreal by the Educational Committee, under F. R. Jenkins and the Industrial Relations Committee under A. B. Gates. This conference was attended by representatives from many of the large companies in the United States and all the large companies in Canada from Winnipeg east. This conference occupied one full day, in which matters pertaining to the education and training of employees in the industry were discussed.

This was the first meeting which the N. E. L. A. has held in Canada, and the executives of this association trust that it is a forerunner of many subsequent meetings in this territory.

Publications

The practice of the Canadian Electrical Association is to publish the committee reports in one bound volume after the annual convention, which "Proceedings" contain all the reports and discussions as well as the speeches made during the convention. The reports for the past year includes, in the Engineering Section a report of the Electrical Apparatus Committee, dealing with the new equipment or developments of the past year, and one of the Hydraulic Power Committee describing a few typical installations, but principally devoted to a report of a subcommittee dealing with the "Methods of Handling Ice and Heating of Sluice Gates and Trash Racks in Hydro-Electric Plants." The latter was considered of sufficient importance to be reprinted in pamphlet form and a limited number of these reprints are available for those requiring copies. This report is being adopted by the National Committee of the N. E. L. A. for further study and J. F. Roberts, the chairman of the subcommittee responsible for the drafting of this report has been appointed as chairman of the subcommittee of the N. E. L. A. committee for this amplification. The Canadian Hydraulic Power Committee is also active on another N. E. L. A. Hydraulic Power subcommittee, namely that of "Foreign Practice," under the chairmanship of Prof. E. Brown.

The Overhead and Underground Systems, and the Inductive Coordination Committees both presented reports which proved of considerable interest to our members at the convention, and they were responsible for a very interesting and active discussion.

The Commercial Section's activities for the past year consisted of the work of the following committees:

General Merchandising Committee.
Industrial and Street Lighting Committee.
Power Sales Bureau.
Wiring Sales Committee.

These committees presented very excellent reports, creating an active discussion at the convention.

The Canadian Electrical Association awards a Resuscitation Medal to any employee of a public utility company in Canada who successfully resuscitates anyone overcome by electrical shock. At the last executive meeting three such medals were awarded as follows:

Ernest Rogers, Chicoutimi, Que.
Albert Barnetson, Toronto, Ont.
Pierre Parent, Shawinigan Falls, Que.

EAST CENTRAL GEOGRAPHIC DIVISION

L. B. Herrington, *President* **D. L. Gaskill**, *Secretary-Treasurer*

East Central News

By D. L. Gaskill

Probably no feature of the work of the East Central Division is valued more highly than that of the standing committees. However, the Division has been working to do away with the system of having presented at the conventions annual reports of the standing committees, leaving detailed reports and discussions to be brought out at the committee meetings during the year.

Abbreviated reports setting out the nature of the work done during the year are published in the issue of the *East Central Division Monthly* preceding the annual convention, while addresses, covering in a more general way the work of the committees, are presented at the convention. The part that the standing committees should take in the annual convention is a very interesting study.

At the conference of Public Utility Association Secretaries, to be held in Chicago, Ill., beginning December 2, the secretary of the East Central Division will address the delegates on the question of whether the annual convention should be abolished and the work of the Division be given over entirely to conferences of the standing committees or whether the annual convention should be a substantial part of the Division activities. The speaker will say that the annual convention is still a necessity in association work, not only from the standpoint of business, but from the necessary standpoint of everyone in the industry becoming acquainted. When we come to weigh the profits of a meeting, it is probable that the greatest benefit derived is from the meeting of others engaged in the industry.

Experience of past years, however, has led the writer to the conclusion that detailed reports of standing committees along a particular line are out of place at an annual convention. The annual convention is the place where those prominent in the industry spread the gospel of advancement for the industry, and to attempt to confine it to any one line or to have certain sessions given over to one phase of work does not give the general satisfaction which a meeting that is interesting to all gives. For that reason the East Central Division has been moving toward addresses covering the general trend of the industry rather than to detailed reports, leaving the reports to be published in the Division's *Monthly*, or to come from the accounts of activities.

The writer believes that the annual convention is a very necessary adjunct of any association, and he also believes in the work of the standing committees. If a choice had to be made between the standing committees and their meetings as against the convention held annually, he would vote in favor of the standing committee meetings instead of the annual convention; however, a combination of both results in better work.

The date for the East Central Division convention has not been set. The Executive Committee will meet in the city of Dayton on December 12 to determine the date.

The high spot meeting of the year was held in Cincinnati on November 13 and 14—that of the Accident Prevention Committee. Over two hundred and fifty were registered in attendance and the two-day program was carried out in detail. One of the pleasant features of the meeting was the presentation of the Insull Medal to one of the Cincinnati employees.

West Virginia Association Convention

STRESS was laid at the twelfth annual meeting of the Public Utilities Association of West Virginia, which was held at Wheeling on Oct. 23 and 24, on the need for a higher caliber of service and a better understanding on the part of the public of the problems of utilities. Electrification of rural communities was also one of the major subjects discussed. There was an attendance of between 185 and 200 delegates from all sections of the State.

President A. Clint Spurr said that the public was being informed of some of the alleged mysteries surrounding public utilities, and he felt that the educational committees of the various organizations had done a great work along that line. He briefly traced the development of utilities in West Virginia and linked their growth with the growth of electricity all over the world.

R. S. Soule of Fairmont, educational director of the Monongahela-West Penn Public Service Company, talked on "The Conference Method of Improving Contacts." "Transportation Problems in West Virginia" was the subject of an address by Charles Gordon, managing director of the American Electric Railway Association. Safety work by the various utilities of the State was briefly discussed by W. A. Buchanon of Morgantown, A. Clint Spurr and H. F. Webb.

On electrification of rural communities R. Paul Smith of Hagerstown, Md., vice-president Potomac Edison Power Company, said: "There is an attitude among many rural communities that they have been shunned by the utility companies. The farmer is just as important in electricity consumption as the urban user."

A brief address on "Rural Electricity" was made by J. R. Howard of Washington, D. C., past-president of the American Farm Bureau.

A movietone message from Thomas A. Edison was given at the annual dinner, at which A. Clint Spurr was master of ceremonies, the principal speaker being H. C. Ogden, publisher of Wheeling newspapers, whose subject was Edison.

On the second day three members of the Monongahela-West Penn group made addresses on the general topic "The Right and the Wrong." Merchandising was the subject of George E. Whitwell, vice-president Duquesne Light Company of Pittsburgh, who observed: "Merchandising can well be divided into four parts. They are the actual selling, price, service and distribution. The best method of increasing sales is to persuade each employee to become a salesman through his enthusiasm and attitude toward the company. If the proper cooperation between producing manufacturers and distributing agencies were obtained, it would be possible to reduce the price of commodities placed on the market by utility organizations."

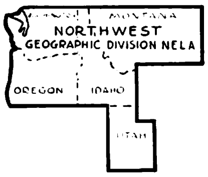
New officers were elected as follows: President, W. F. Ficklen, Charleston; first vice-president, C. H. Hardesty, Fairmont; second vice-president, F. M. Hawley, Bluefield; third vice-president, H. M. Cogan, Charleston. A Bliss McCrum was reelected secretary and B. M. Mohr, treasurer.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

M. L. Hibbard, *President* **Berkeley Snow**, *Secretary*

Northwest News Letter

By Berkeley Snow



With Light's Golden Jubilee and the National Food Preservation Program behind us, interest is now centering on the more routine functions of association work—the studies undertaken by the standing committees and the preparation of reports based on these studies. In this geographic division committee work for the year, in so far as Accounting, Commercial and Engineering Section committees are concerned, is brought to a head at the so-called mid-winter conferences of these sections held generally in February and March.

Interest in these conferences this year is given additional impetus by reason of the fact that no general convention is to be held in this Division in 1930. The coming of the national convention to the Pacific Coast offers an excellent opportunity for Northwest companies to send larger delegations than it is possible to send to Atlantic City, and in order that energies and funds may be concentrated on the national event, the Division Executive Committee has resolved to omit a division convention this coming year. This action does not mean any diminution of effort on the part of committees, however. Rather will it have the opposite effect of stimulating effort, since it is most likely that larger delegations to the sectional conferences as well as to the national convention will be the outcome.

Two special studies of national importance are to be undertaken by the Engineering Section of this division during the current association year. Research on the causes of and remedies for radio interference from high tension insulators will be commenced by the Inductive Coordination Committee, headed by H. H. Schoolfield, chief engineer, Pacific Power & Light Company, Portland, Ore. This job was delegated to this division by the Engineering National Section and plans are well under way for the construction of a length of high line on which various tests may be carried out, from which it is hoped an effective and comparatively inexpensive method may be found for eliminating the trouble now experienced on existing lines. A location for the line on college property, and assistance in the experiments, have been offered by Oregon State College, Corvallis.

The second project is a continuation of the studies initiated some years ago on the possibility of controlling the movements of migratory fish, so important in the solution of the fish-and-dam problem. This study is to be carried on by the Fishways Subcommittee of the National Hydraulic Power Committee, composed entirely of Northwest engineers and chairmaned by J. E. Yates, assistant chief engineer, Pacific Power & Light Company, Portland. On the recent receipt of assurances from the U. S. Bureau of Fisheries that the Bureau would cooperate in any project deemed desirable by the committee, the committee is formulating plans for taking up experiments where they were left off last year.

Publications

Below are listed the committee reports or other material published during the past year, giving the publications in which they were printed and the prices of these publications.

The following reports were published in the Special Convention issue of *Electrical West,* May 15, 1929. If copies of this publication are desired, the enquirer should communicate direct with the McGraw-Hill Company of California, 883 Mission Street, San Francisco. If single or a few isolated reports from the list are desired, it might be possible to supply them from the extra copies remaining in the office of the secretary, 1208 Spalding Building, Portland, Ore., at the rate of 10c. per report.

ACCOUNTING SECTION

Customers' Records Committee
- Customers' Records
- By-Monthly Billing
- Even-Consumption Billing
- Credit Policies

Fixed Capital Committee
- The Practical Application of Fixed Capital Records for Fire Insurance

Purchasing and Storeroom Committee
- Purchasing and Storeroom Practice

Statistics Committee
- Presenting Monthly Statistical Data to an Executive

COMMERCIAL SECTION

- Promotional Rates
- Farm Electrification

Lighting Bureau
- Commercial and Industrial Lighting
- Street and Highway Lighting
- Electrical Advertising
- Home-Lighting Education

Merchandising Bureau
- Domestic Electric Refrigeration
- Electric Range Merchandising Policies
- Electric Water Heating
- Merchandising Organization Problems
- Planning Ahead in Merchandise Sales
- Qualifications for Rural Selling

Power Bureau
- Commercial Cooking
- Industrial Heating
- Power Equipment

ENGINEERING SECTION

Executive Committee
Accident Prevention Committee
Committee on Cooperation with Regulatory Bodies
Electrical Apparatus Committee
Hydraulic Power Committee
Experiences in Fishway Construction
Meter Committee
Prime Movers Committee
Overhead Systems Committee
Underground Systems Committee

PUBLIC RELATIONS SECTION

Executive Committee
Women's Committee

GENERAL COMMITTEES

Educational Committee

The proceedings of the Sixth Annual General Meeting of the Engineering Section, at Walla Walla, Wash., March, 1929, containing all the prepared papers and the prepared and impromptu discussion on the subjects under consideration, are published in a separate booklet, extra copies of which are available at the office of the secretary at $1.50 each.

The Proceedings of the Twenty-Second Annual Convention, held at Seattle in June, 1929, are published in a separate booklet, copies of which are available at the office of the secretary at $1.50 each. In addition to reprinting all the committee reports listed as having been first published in *Electrical West,* the Convention proceedings contain also committee reports as follows:

Public Speaking Committee Report
Employees' Relations with the Public Committee Report
Review of Matters Pertaining to Public Policy in Oregon, by Geo. L. Myers

Talks and addresses delivered during the convention are also printed in the Proceedings.

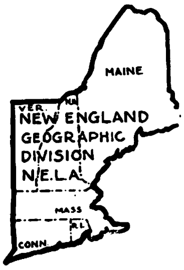
The address of the president, R. M. Boykin, delivered at the June convention, entitled, "Problems and Trends of the Electrical Industry in the Northwest," in pamphlet form may be had from the secretary at 10c. each, or in quantities of 25 or more at 5c. each.

NEW ENGLAND GEOGRAPHIC DIVISION

C. H. Hodskinson, *President* Miss O. A. Bursiel, *Secretary*

New England Activities

By O. A. Bursiel



The Public Relations Section held an interesting all-day meeting on November 14, at the Copley Plaza Hotel, Boston. The meeting was well attended and there were 232 at luncheon. The chairman of the Public Relations Section, L. D. Gibbs, opened the meeting with a brief but most inspiring talk on "Public Relations."

Creighton J. Hill, Babson Statistical Institute, Wellesley Hills, Massachusetts, addressed the gathering on "The Importance of Customer Ownership in Public Utility Development." Mr. Hill stated that he saw no reason why the extremely low market of the last few weeks should retard customer ownership in public utilities and reaffirmed the confidence of the Babson organization in the essential value of that ownership, asserting that the outlook is brighter today than it ever was.

Dr. Samuel W. Stratton, president, Massachusetts Institute of Technology, Cambridge, Mass., delivered an inspiring address on "Cooperation in Education." Dr. Stratton strongly advocated placing education and industry on a more cooperative basis, whereby industry, which is mainly dependent upon the trained graduates of educational institutions for its personnel, should bear its proportionate share of the expense involved in training college men.

Miss Mary Hopkins, director of training, Jordan Marsh Company, Boston, gave an interesting talk on "Public Contact Training of Employees." She stated it costs $75 to $100 to break in every new employee, and this means wise selection should be made.

Miss Sara Harris, chairman, National Women's Committee, chose for her topic, "Women in the Electrical Industry." "What is expected of the woman in business?" was the question raised by Miss Harris, and she answered it by saying that she had learned to expect just as much from the woman as from the man. She said there was no reason whatever for making any distinction between the two—that women are becoming generally recognized in business as equal to the male employee.

New England is manifesting much interest in the Employees' Public Speaking Contest and plans are now under way for the various company contests.

The Women's Committee, Miss Sue M. Carr, chairman, held its organization meeting on Oct. 22, with 100 per cent attendance.

Engineering Section

The Engineering Section, C. A. Mayo, chairman, is now fully organized and plans for the year are well under way.

The Hydraulic Power Committee, W. F. Uhl, chairman, held its first meeting at the Alden Hydraulic Laboratory, Chaffius, Mass., on Nov. 18. The members inspected the many interesting new models which have been developed and tested at the laboratory since the last meeting there, and Professor Allen of Worcester Polytechnic Institute showed them some of the models under test conditions.

The Accident Prevention Committee and Electrical Apparatus Committee have also held their organization meetings.

Commercial Section

The Power Committee, Thomas D. Bond, chairman, is active as usual, holding regular monthly meetings in conjunction with the New England Central Station Association of Power Engineers. At the last meeting of the committee held on Oct. 30, the following subcommittees made reports: Editing, Motor Characteristics, and Steam Utilization.

The Commercial and Industrial Lighting Committee, E. J. Broderick, chairman, held its first meeting on Nov. 15.

Accounting Section

The Customers' Records Committee, G. W. Rogers, chairman, has been very active, having held two meetings within the month at Headquarters. The committee, at its first meeting decided to consider the following subjects during the ensuing year:

1. Applications for service.
2. Consumer deposits.
3. Meter records.
4. Billing.
5. Collections.

Civic Development Committee

Chairman W. C. Bell held a meeting of the Civic Development Committee and plans were discussed for cooperating with the Massachusetts Tercentenary Committee in connection with its celebration in 1930.

General News

The Division's secretary, Miss O. A. Bursiel, addressed a gathering of Women's Club members at Wareham, Mass., on Nov. 20, having as subject "Electricity in the Home."

The Fifth New England Conference of the New England Council was held in Boston at the Hotel Statler on Nov. 21 and 22. A large number of the public utility executives of New England were present. The accredited delegates from the New England Division were Frank H. Golding, vice-president, Cambridge Electric Light Co., Cambridge, Mass., and David Daly, president, Blackstone Valley Gas & Electric Co., Pawtucket, R. I.

Publications

Copies of the Proceedings of the New England Industrial Electric Heating Conference held at Massachusetts Institute of Technology, Feb. 28 and March 1, 1929, are available at New England Division Headquarters, 1113 Statler Building, Boston, Mass., at 40 cents per copy.

GREAT LAKES GEOGRAPHIC DIVISION

G. C. Neff, *President* Tom C. Polk, *Secretary*

Great Lakes Notes

By Tom C Polk

WIS
GREAT LAKES
GEOGRAPHIC DIVISION
N.E.L.A.
MICH
IND.
ILL.

A conference of divisional delegates met at the Palmer House, Chicago, on Nov. 15 for a business session and luncheon. President G. C. Neff presided. Paul S. Clapp was also present at this meeting and gave an intimate picture of the work being done by the Association Headquarters staff. French Lick was named as the place for the annual 1930 convention, to be held on Sept. 25, 26 and 27.

The delegates voted to offer a divisional prize of $100 in cash, and expenses to the National Convention at San Francisco to the winner of the National Employees' Speaking Contest. The divisional elimination contest will be held the early part of May.

The Executive Committee was instructed by the delegates to make a study of state and divisional activities in the four States, with the thought in mind of coordinating all association work and eliminating duplication of effort.

Arrangements are being completed by the Women's Committee to hold a short course in home economics and demonstrations of gas and electric home appliances at Purdue University next March.

At a meeting in Chicago, Nov. 25, of a special committee of the Commercial Section, plans were made for the Electrical Advertising School and Merchandising Sales Conference to be held at the Chicago Edgewater Beach Hotel, Jan. 20, 21 and 22.

The customer Relations Committee will also hold a special meeting at that time.

On Nov. 11 and 12, at the Edgewater Beach Hotel, Chicago, George F. Oxley presided over an interesting meeting of the Public Information Bureau Directors and Publicity men. At a special after-dinner session, Messrs. John W. Lapham of the North Central Division, and C. M. Kilian of the Southeastern Division, delivered a barrage of new stories, with Thorne Browne acting as referee.

The division office has been moved to the Chicago Civic Opera Building, located at 20 North Wacker Drive. At least fifteen floors of the forty-six story building will be occupied by public utility companies and allied interests.

The Chicago Electric Club and Association will occupy two or three floors containing several dining and meeting rooms. In addition, there will be a lighting institute.

We hope N. E. L. A. members will feel free to use the facilities of our office. If you want to arrange for a meeting place, hotel or theater reservations, let us serve you.

The following convention reports and addresses have been printed by the Division. Copies may be secured from the secretary, 20 North Wacker Drive, Chicago.

ACCOUNTING SECTION

General Records Committee
Purchasing & Store Room Committee
Statistics Committee

COMMERCIAL SECTION

Commercial Section Activities, 1928-29. (Douglas Dow, Chairman)
1929 Lamp Sales Activity
Proceedings of Merchandising Sales Conference
Prospectus — Employees' 1929 Lamp Sales Activity

ENGINEERING SECTION

Engineering Section Activities, 1928-1929. (F. E. Andrews, Chairman)
Electrical Apparatus Committee
Inductive Coordination Committee
Hydraulic Power Committee
Meter Committee
Overhead Systems Committee
Prime Movers Committee
Underground Systems Committee

PUBLIC RELATIONS SECTION

Public Speaking Committee
Women's Committee

MISCELLANEOUS

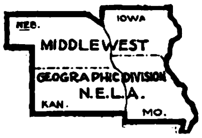
Report of Rural Electric Service Committee
A Study of Public Utility Company Policies and Practices from a Customer Relations Viewpoint on the Subjects of Bill Delivery Policies
The Customers and Unmetered Energy
Delinquent Accounts from the Customers' Standpoint
Bill Guarantee Deposits and Refunds
Blue Sky Regulation and Public Utility Securities (By Geo. C. Mathews)
Development of Electricity on the Farm (By M. S. Winder)
The Broader Aspects of Utility Engineering (By L. B. Andrus)
Lost Watts (By R. J. Malcomson, Public Service Co.)
Industrial Development Activities of Public Utilities (By A. R. Gwinn)
Selling the Lighting Service Department to Company Executives (By J. F. Blackburn)
The New Competition in Power Sales (By Chas. D. Malloch)
How to Sell More and Better Lighting in the Home (By J. W. McIver)
Rates for Electric Service (By Frank E. Kruesi)
Sources of Information in Electric Light and Power Field (By Edwin J. Fowler)

MIDDLE WEST GEOGRAPHIC DIVISION

A. E. Bettis, *President* **Thorne Browne**, *Managing Director*

Middle-West Activities

By Thorne Browne



During the month ending with this report, meetings were held by the executive committee of the Engineering Section, the Industrial Relations Committee, the Customer Relations Committee, the Educational Committee, the executive committee of the Commercial Section, the executive committee of the Accounting Section, and a conference was held between representatives of the Middle West Division Rural Electric Service Committee and the Rural Lines Committee of Iowa Section.

Engineering Meetings

The executive committee of the Engineering Section, all members present, met at Kansas City on October 30 and outlined the program for an all-day engineering conference to be held December 6. This is a meeting for engineers of the division in general. With agenda to guide it, each committee will meet separately for all-day round-table discussion. In the evening, following a dinner that will be in no sense a banquet, the various chairmen will outline the year's work planned for his committee and an address will be given by some engineer of prominence.

The Industrial Relations Committee, the Customer Relations Committee, and the Educational Committee have joint committee structure and by mutual agreement will hold all meetings jointly. The first of these was held at Kansas City on October 29, all members present. It was agreed to ask each member company in the division to furnish the name of the head of these activities for that company, and where no such organization exists, to urge the appointment of a responsible head. With these gentlemen the committee will contact, and approximately once a month will distribute service suggestions on the three lines of related activities for which the committee stands sponsor. The joint committee will also sponsor one meeting during the year in each of the States of the division for purposes of discussing the problems of these related activities and also to secure, as much as possible, similar meetings occasionally within the organization of each company.

Commercial

The executive committee of the Commercial Section, all members present, met at Omaha on November 20 to check up on progress in activities of this section, which have now run through a two-year period. It was agreed to specialize in preparing and distributing (a) an illustrated compendium of home service kitchen layouts and operating plans as exemplified in the division, these illustrations to represent different types applicable to different size towns; (b) an analysis of successful sales methods in use in the division and elsewhere for rural merchandising; (c) sales campaign plans for commercial cooking, industrial heating, and industrial lighting; (d) an illustrated compilation of merchandise stores plans, arrangement, description, and explanation of reasons for varying arrangements, these to be selected for the purpose of offering ideas on store displays applicable to different sizes of towns.

Accounting

The executive committee of the Accounting National Section met at Chicago on October 24 in conjunction with meeting of the Accounting National Section and checked over progress being made in carrying out the year's work outlined at a preceding meeting of the entire membership of the section.

Rural Service

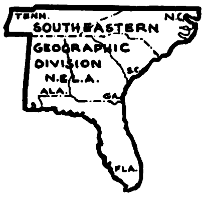
Chairman K. R. MacKinnon of the Rural Electric Service Committee of the division met with members of the Rural Lines Committee of Iowa Section at Des Moines on November 8 to plan the first of a series of rural conferences. It was agreed that the first conference should be held at Des Moines to discuss rural electrification problems, the meeting to be attended largely by representatives of Iowa companies. This conference is jointly sponsored by the Middle West Committee and Iowa Section Rural Committee.

SOUTHEASTERN GEOGRAPHIC DIVISION

T. H. Tutwiler, *President* **C. M. Kilian**, *Secretary*

Warm Breezes from the Southeast

By C. M. Kilian



Of particular interest to those present at the recent Engineering Section meeting of the Southeastern Division was the discussion on telephone protective equipment. The equipment of the Georgia Power Company and the Alabama Power Company was described in two interesting papers submitted by L. E. Anderson and B. F. Burch. A thorough study of telephone protective equipment is being inaugurated by the engineers of the Division. Copies of the papers mentioned may be had upon request to Southeastern Headquarters of the N. E. L. A., 207 Bona Allen Building, Atlanta, Ga.

Load Prognostication

An illustrated presentation of this subject by A. K. MacNaughton, Vice-Chairman of the Engineering Section and Electrical Engineer for the Georgia Power Company, elicited much favorable comment.

Mr. MacNaughton reported that after the study on Atlanta was complete, a check on general figures was made with telephone company engineers, and they were found to closely approximate each other.

Comment was made to the effect that in load forecasts of this nature, curves developed from one study could not be used from year to year without adjustment and without being brought up to date from time to time.

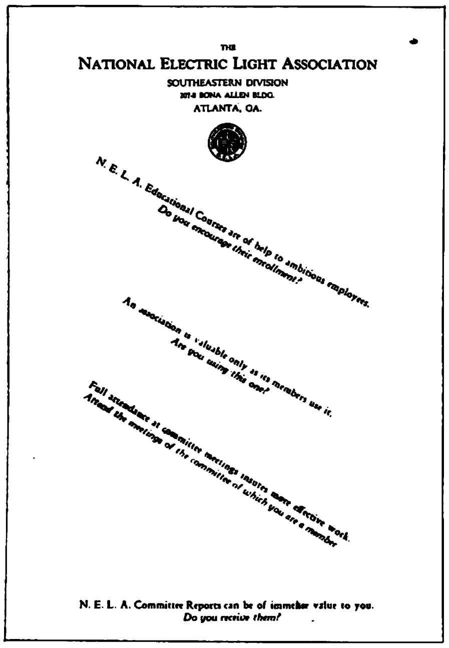
A general discussion developed the thought that a load survey of small towns for the purpose of forecast might lead to very inaccurate forecasts.

Study of Power Company Buildings Inaugurated

Lack of windows, too many windows, not enough doors, the wrong size doors, improper locations of entrances and exits, faulty roofs, inefficient steel sash, failure by contractors to follow specifications in construction, etc., etc., were a few of the things mentioned when the question, "What's wrong with our buildings?" was asked. A committee to study the subject has been appointed and will make a report.

Widespread Executive Support in Southeast

According to *Nela-Graph,* issued informally "Now and Then To Personalize the Southeastern Division," the



THE
NATIONAL ELECTRIC LIGHT ASSOCIATION
SOUTHEASTERN DIVISION
207-8 BONA ALLEN BLDG.
ATLANTA, GA.

N. E. L. A. Educational Courses are of help to ambitious employees.
Do you encourage their enrollment?

An association is valuable only as its members use it.
Are you using this one?

Full attendance at committee meetings insures more effective work.
Attend the meetings of the committee of which you are a member.

N. E. L. A. Committee Reports can be of immediate value to you.
Do you receive them?

Reduced letterhead of the Southeastern Division. The letterheads are printed with legends in various colors at the bottom. Three of the legends are reproduced diagonally across the face of this cut to indicate their range and variety. Mr. Kilian feels these comments are good reminders that the Association, to do the greatest good, needs the active cooperation of its members.

Southeastern Division has the executive support to the extent that every member company is represented in one or more activities of the Division.

Cities May Assess Property Owners for Ornamental Street Lighting in Alabama

Nela-Graph also reports, according to W. C. Allen, Lighting Engineer for the Birmingham Electric Company, that the Legislature of the State of Alabama has passed a bill authorizing cities of over 100,000 population to install ornamental street lighting and to assess abutting property owners for the cost of installation.

A copy of the bill may be had upon request to the Southeastern Division, N. E. L. A., 207 Bona Allen Building, Atlanta, Ga.

National Educational Committee Bulletin Designed

Impressed with the bulletin board posters used by the Division for promoting the N. E. L. A. Educational Courses, Fred R. Jenkins, Chairman of the National Committee, requested the division to submit layouts and copy for a national bulletin. This was done, with the result that the attractive poster, "The Common Roads are Always Crowded," is now being circulated nationally.

Necessity for Employee Education Stressed

Among the many things discussed at the meeting of the Public Relations Section, November 21, the subject of more systematic education of employees, the relation of their job to other jobs in the company, their relations to the customers with whom they come in contact, was the subject most thoroughly agreed upon.

It was the consensus of opinion of those present that the subject of the National Employees Speaking Contest was a most appropriate one for this purpose and as an additional incentive for participation in this contest divisional prizes have been arranged.

We plan to hold a series of employee meetings within the division at which the speaking contest will be presented with the thought of stimulating widespread interest.

Difference of Opinion on Public Relations

Because there was some divergence of opinion as to what constitutes a complete Public Relations department and its functions as regards other departments of the business, the Public Relations Section of this division plans to prepare an exhaustive report on the subject which, of course, will express an ideal to be achieved.

Economic Loss to Students Outlined

The subject of cooperation with engineering schools and the presentation of practical present-day problems of power company operation brought forth the opinion that students with only theoretical knowledge upon graduation were faced with an immediate economic loss due to their inability to apply such knowledge to practical problems.

With a view to assisting those engineering students who plan to enter the public utility business and who do not have the opportunity of practical experience alternating with their studies, it was decided to make a survey of existing plans and opinions as to their effectiveness and adaptability for application in the engineering classes of the Southeast. After this survey has been completed, a plan will be formulated for submission to engineering classes within the division along the lines in consonance with the policies of the higher educational institutions.

Publications

The following reports and papers have been reproduced by the division during the calendar year 1929 and may be secured from the secretary, 207-8 Bona Allen Building, Atlanta, Ga. The prices shown are for single copies only. Quantity prices will be quoted upon application. There is no charge for papers marked N/C.

	Single Copies
ACCOUNTING SECTION	
Customers' Records Committee	
Handling Final Bills, Discontinued Accounts and Determination of Uncollectable Accounts*	.50
COMMERCIAL SECTION	
Merchandise Bureau	
Report of Sales Committee	.50
Report of Refrigeration Committee	.50
Power Bureau	
The Electric Truck in the Southeast	N/C
Industrial Heating in the Southeast	N/C
Competitive Power Committee	
Conditions Surrounding the Sale of Hydro-Electric Power to Large Pulp and Paper Mills with Large Requirements for Low Pressure Process Steam*	.25
Market Development—An Opportunity for the Electrical Industry. By Stewart L. Mims (Presented at Asheville Convention, May 1929	.50
ENGINEERING SECTION	
Electrical Apparatus Committee	
Calculation of Ground Currents*	.50
Protective Grounding for Generating Plants, Outdoor and Indoor Substations*	.50
Uniform Records of Electrical Operation of Power Systems. (Issued as a National Report.) (Copies can be secured from New York office)	
Meter Committee	
Operating & Metering Neon Sign Lighting Loads, Education & Training of the Meterman* (Paper presented at Meter Committee Meeting, February, 1929, by E. M. Lynch)	N/C
Multirange Precision Current & Potential Transformers and Various Useful Applications.* By L. E. Johnson (Presented at Meter Committee Meeting, February, 1929)	N/C
Benefits Derived from the Use of Safety Type Switches.* By L. N. Wilson (Presented at Meter Committee Meeting, February, 1929)	N/C
Periodic Testing of Watthour Meters.* By L. P. Jones (Paper submitted at S. E. Div. Meter Committee Meeting, February, 1929)	N/C
Prime Movers-Hydraulic Power Committee	
Economic Results of Operating Water Wheels at Their Most Efficient Loads	.50
Communication Facilities of Alabama Power Company.* (By B. F. Burch)	N/C
Telephone Protective Equipment on Georgia Power Company System. (By L. E. Anderson)	N/C
Preferred Voltage Ratings for A. C. Systems. (By A. L. Harding)	.50
PUBLIC RELATIONS SECTION	
Report on Customer Relations and Employee Training	.50
MISCELLANEOUS	
The Trend of Regulation. (By Hon. I. M. Bailey)	N/C

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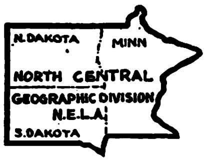
*Single copies only available.

NORTH CENTRAL ELECTRICAL ASSOCIATION

Thomas T. Parker, *President* **John W. Lapham,** *Secretary*

North Central Notes

By John W. Lapham



The Women's Committee of the North Central Division held their annual meeting at the Nicollet Hotel, Minneapolis, Minn., on November 22-23, 1929, Mrs. Mabel H. Wilson, presiding.

A very interesting program was developed in the two day session. Several outside speakers were present. One of these speakers—Mrs. Ruth Carpenter, spoke on "the modern business woman." She stated that in her opinion two essentials of the modern business woman today were, first, a sense of humor and second, resourcefulness.

W. H. Brown, Safety Director, Northern States Power Co., Minneapolis, Minn., spoke on safety in the home, giving statistics which show that the greater number of accidents occurred there, and telling of the need for educational work in this field.

A particularly interesting feature of the meeting was the discussion on Home Service. This developed the idea that home service work was gradually increasing in most of the companies and that specific demonstration of electrical devices led to more sales. Those participating in this discussion were: Miss Ethel Stark, Minneapolis, Mrs. Lilly Smith, Duluth, Mrs. Alice Works, St. Paul, and Miss Leona Jantz, Sioux Falls, S. D.

Miss Vera Bauman of Huron, S. D., gave a very interesting discussion of the Middle West Utility Conference recently held at Biloxi, Miss.

T. D. Crocker, Northern States Power Co., Minneapolis, developed the subject of rates.

John Lapham, N. C. E. A., Minneapolis, gave a general discussion of electrical development.

One-half day was spent in the new Northern States Power Co. bungalow and the various lighting equipment in the rooms was explained by Miss Laurene Littel, Home Lighting Consultant.

The meeting was more largely attended than heretofore.

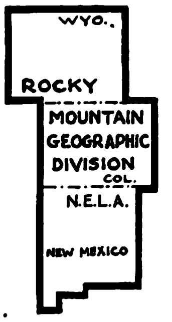
One hundred and ten high schools in the State of South Dakota are debating the following subject: "Should the State of South Dakota build and operate a Hydro-Electric Plant on the Missouri River?" This office, as well as N. E. L. A. Headquarters and local managers, has been besieged with requests for information on water power and public ownership.

ROCKY MOUNTAIN GEOGRAPHIC DIVISION

W. D. Johnston, *President* **O. A. Weller,** *Secretary*

Rocky Mountain News

By O. A. Weller



One of the oldest and best reputed newspapers of the Rocky Mountain Region has been known for over 50 years as the *Rocky Mountain News.* This monthly news letter of the Rocky Mountain Division, N. E. L. A., may therefore be assumed to be the youngest child of our local venerable newspaper.

In spite of constant snow in most of the Rocky Mountain States for a period of four weeks and abnormally low temperatures (all of which is very unusual) there has been a degree of enthusiasm and responsiveness in association work such as has not before been experienced in this geographic division. Every section and committee is fully organized. A program of work in each of the four major sections is now well outlined. The sessions of the several sections thus far held have been unusually well attended.

Commercial Activities

An illustration of the program of work will be found in the following subjects adopted for study by the commercial section:

Tabulation of Appliances as to Revenue Values, Load Factors, Demand, etc.

Electric Water Heater—Kind, Type, Efficiency.

Off-Peak Water Heating.

Oil Burners as Electric Load Builders.

Standardization and Stock Turnover.

How to Build Selling Campaigns; What to Sell; How to Sell It.

Promotional Rates in the Rocky Mountain States.

Street Lighting, Flood Lighting and Display Lighting as Load Builders.

Neon Sign with Power Factor Characteristics.

Public Relations

At a recent meeting of the Public Relations Section plans were developed for applying in local companies the report of the National Industrial Relations Committee covering the general topic of training employees for public contact work. Plans were promoted for the appointment of a key man in each company organization to study and apply the principles and suggestions incorporated in this report. Another activity was developed in connection with the Women's Committee work. It is proposed to create a group for the study of decorative lighting as a special means of employing the talents of the women of the industry in a field that is almost entirely unexplored. Public speaking work in the Rocky Mountain Region is being organized with the slogan "Facts Are Worth More Than Form." In other words, while our employees are studying the art of public address they will primarily devote themselves to a study of the facts of their own industry.

The National Employees Speaking Contest is receiving much attention in this geographic division. The following program has been adopted:

Months of November and December—Work of training groups and registration for contest.

Jan. 2—Final date for registration with the month of January for continued training and practice.

Month of February—Company elimination contests.

Month of March—State elimination contest.

April 24 and 25—Geographic Division elimination contest in connection with tri-state conference of Accounting and Public Relations Section.

In the city of Denver several employee study groups are now organized and under way with the prospect that more than 100 utility employees will be actively engaged in public speaking studies.

The Rocky Mountain Division due to budget limitations carries on all of its work through voluntary and part-time service of committeemen and association officers. From the standpoint of enthusiasm in the work and perhaps results achieved this is not detrimental. It is planned to extend the part-time administration of association affairs through a retainer basis. About this plan we shall have more to say in future issues of the *Rocky Mountain News.*

PACIFIC COAST ELECTRICAL ASSOCIATION

E. B. Criddle, *President* **Samuel H. Taylor**, *Secretary*

Pacific Coast Items

By Samuel H. Taylor

PACIFIC COAST
GEOGRAPHIC
DIVISION
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It has been the customary practice of this Association, in the past, to confine the publication of committee reports, together with the activities of our Annual Convention, under one cover and the title of "Proceedings, Pacific Coast Electrical Association."

The current year we were enabled through the cooperation of our publishers, the McGraw-Hill Co. of California, to complete and distribute the proceedings to our membership within the 60-day period of time, following our convention held at the Hotel Del Monte, California, June 19 to 22, 1929.

In addition, during the past year two publications of considerable value, viz: "Agricultural Power Handbook" and a "Manual on Electric Air Heating," have been developed and individually published. The former is in loose leaf form, 8½ in. x 11 in. size pages. Repeated demands continue to reach this office for copies of the handbook from all portions of this country. The "Manual on Electric Air Heating" is in pamphlet form, 4 in. x 7 in. in size, and has been generously utilized by the member companies of this division in the development of air heating business.

There has been much thought and study given the subject of a change in our present publication methods. It has been thought advisable by many of our members to discontinue the publication of our annual proceedings, substituting therefor publication of our committee reports in like manner with the reports of the National Association.

Our Engineering Section has developed many interesting reports during past years, and no doubt will continue to do so in the future. These should be made available for such as are interested in a specific subject, rather than hidden away in a mass of pages of no interest to the great majority of our members.

Our sections and committees are organized and have each held a conference meeting, and will have like conferences in January, at which time we hope to be able to present something of interest as an incentive to our Eastern coworkers to spend a few days with us in San Francisco next June.

SOUTHWESTERN GEOGRAPHIC DIVISION

Fred W. Insull, *President* **S. J. Ballinger**, *Secretary*

Southwestern News Letter

By S. J. Ballinger

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Tentatively scheduled for Jan. 7 to 11 inclusive, subject to change in dates if necessary in securing school facilities and instructors, the Southwestern Division has announced a School of Illumination to be established at Tulane University, New Orleans. P. E. McChesney, Chairman of the Commercial Section of the Southwestern Division, is in charge of the arrangements, and an advance program is being planned that will attract lighting experts from companies and manufacturers. Mr. McChesney is now in the East arranging for instructors and lecturers, and Tulane, which boasts of a splendid engineering school, is enthusiastic to inaugurate a School of Illumination. At this time it is probable that the school will especially feature home and store illumination, with lectures and courses on practically all other forms. Certificates will be presented to those who finish the prescribed course satisfactorily, and President Fred W. Insull of the Southwestern Division will preside at a banquet for this purpose on the last night of the school. Other prominent speakers, including J. G. Holtzclaw, Chairman of the Public Relations Section, will appear on the banquet program. This is the first School of Illumination in the Southwest, and, as far as we can learn, the first school established under the auspices of any division.

Short Course in Home Economics

The success which has attended the Short Course in Home Economics at Stillwater A & M College in Oklahoma, established by the Southwestern Division three years ago, has encouraged the executives to arrange for an additional course along similar lines to be established at Denton, Texas, where one of the State Teachers Colleges is located. The Stillwater course has won national recognition along with the Short Course at Ames, Iowa, and will be a permanent feature of activities in the Southwest. More than fifty girls attended the Short Course in 1929, and a larger number is expected to enroll in 1930. The establishment of a similar school at Denton will be especially attractive to member companies in the southern part of the division, and a large enrollment is expected from Texas and Louisiana.

Educational and Industrial Conference in Dallas

Arrangements are completed for an Educational and Industrial Conference to be held at the Baker Hotel, Dallas, Texas, Friday, December 6, immediately following an Executive Committee meeting scheduled for the same day. Homer Niesz, Chairman of the National Industrial Relations Committee, and Fred R. Jenkins, Chairman of the National Educational Committee, will be among the speakers on this occasion. The program calls for a general discussion of employee activities along many lines, and it is expected that such an exchange of thought will be beneficial to all companies in their industrial and educational work. Practically all of the larger companies of the Southwest are spending time and money on employee educational activities. Considerable time will be devoted to a discussion of Educational and Industrial Activities in the smaller communities.

Engineering Section Meeting

More than forty operating engineers in the electrical industry in the Southwest assembled at Fort Worth during November upon the call of the Engineering Section Chairman, R. F. Danner, to discuss engineering problems of particular interest to those in this territory. Among other things, it was decided at this meeting to discontinue the large Engineering Report that has been published in the past in this division, and publish the reports of each committee separately. Chairman Danner requested all reports to be in by the middle of March, at which time they will be passed upon by an Engineering Section Meeting and then referred to the Executive Committee.

Power Manual Wins Recognition Throughout United States

Among the many papers and reports prepared by the committees of the

Southwestern Division and presented at the 1929 Convention, was the Power Manual covering "Power Requirements, Power Costs, and Power Conservation," prepared by the Power Bureau of the Commercial Section. There has been a steadily increasing demand for these Manuals, and they can be secured from the secretary, Southwestern Geographic Division, in care of San Antonio Public Service Co., San Antonio, Texas, at a cost of $1.50 each.

Other Publications

Among other publications prepared by this division for the administrative year 1928-29 are the following:

Report of Accounting Section.
Report of Commercial Section.
Report of Engineering Section.
Report of Public Relations Section.
Report of Accident Prevention Committee.
Report of Civic Development Committee.
Report of Rural Electric Service Committee.
Report of Wiring Committee.
Report of the Women's Committee.

NEW MEMBER OF PUBLIC POLICY COMMITTEE

George H. Howard
President of the United Corporation and Chairman of the Executive Committee, Niagara & Hudson Power Corporation. Mr. Howard was elected to membership in the N. E. L. A. Public Policy Committee at the meeting held on Nov. 26.

RELATED and other ORGANIZATIONS

Conference of Public Utility Information Group

DISSEMINATION of information to the public was the main topic of a gathering of directors of public utility information bureaus, geographic division secretaries, and advertising, publicity and public relations men of the utility industry at the Edgewater Beach Hotel, Chicago, November 11th and 12th.

George F. Oxley, Director Department of Public Information, N E L A read a letter from Charles Gordon, Managing Director of the American Electric Railway Association, who was unable to be present, giving a general picture of conditions in the electric railway industry. This was followed by a similar presentation for the gas industry by B. J. Mullaney, newly elected president of the American Gas Association. Paul S. Clapp, Managing Director of the N E L A, spoke on the electric light and power industry.

The services of the three national associations were described in detail by Labert St. Clair of the American Electric Railway Association, Keith Clevenger of the American Gas Association, and Mr. Oxley of the N E L A. J. S. S. Richardson of the Joint Committee of National Utility Associations explained the publicity activities of that association.

On Monday evening, November 11th, at an informal dinner, J. F. Owens, a vice president of the N E L A and former chairman of the Public Relations National Section, spoke on the general subject of publicity, national conditions, including mergers, trend toward lower rates, etc.

B. J. Mullaney addressed the Tuesday morning session on the publicity and advertising methods of public utilities and this was followed by a general discussion.

Those present at the meetings were:

W. J. Baldwin, Clark Belden, James M. Bennett H. M. Blain, Jesse Blythe, C. W. Bradley, Arthur W. Brady, Thorne Browne, Joe Carmichael, Paul S. Clapp, Keith Clevenger, H. B. Converse, F. W. Crone, William H. Culver, Miss Isabell Davie, D. M. DeBard, William C. Edwards, Thomas F. English, E. Frank Gardiner, Joseph B. Groce, R. E. Haas, H. F. Herwig, W. H. Hodge, R. J. Holly, Harry E. Jordan, C. M. Kilian, George E. Lewis, John W. Lapham, H. M. Lytle, A. Bliss McCrum, R. R. McGregor, Edward F. McKay, S. T. MacQuarrie, Donald M. Mackie, Miss Sophia Malicki,

(*Continued on page* 821)

The 1930 Better Copy Contest

THE Public Utilities Advertising Association will again conduct a nationwide "Better Copy Contest." Contests held in previous years have been of unquestioned value in the stimulation of better copy in public utility advertising. This contest will give national recognition to outstanding public utility advertising.

The National Electric Light Association, the American Gas Association, the American Electric Railway Association, and the Advertising Federation of America have joined in cooperation for the success of this activity. In the past few years notable progress has been made by public utilities in the improvement of advertising production. Dealing as it does with the varied operations of public relations, securities, commercial and merchandising work, public utility advertising has a large responsibility. The contest is carried on for the purposes of maintaining high standards, awarding recognition to outstanding work and for providing all those associated in public utility advertising work with a collection of representative advertisements.

The contest is to be conducted in four separate divisions:

Electric Light and Power
Gas for the Home and Industry
Transportation
With a special award in the field of telephone advertising.

Beautiful trophies and certificates of award will be presented the three leaders in each division. The trophies, with certificates, will represent first place, and certificates for second and third places will be awarded in each division. Certificates for first place only will be awarded for telephone advertising.

The four national associations will make the awards jointly with the Public Utilities Advertising Association to the winners.

The judging of the winning advertisements in this contest will be done by a board of judges representing the managing directors and directors of advertising or public information departments of the four national associations, together with the chairman of P. U. A. A. Better Copy Committee judges will be: Paul S. Clapp, George F. Oxley, Alexander Forward, Keith Clevenger, Charles Gordon, L. D. Gibbs, Labert St. Clair, J. C. McQuiston, Herbert Metz, Earl Pearson, T. J. McManis, E. W. Swift.

The rules and conditions of the contest may be obtained from E. W. Swift, chairman, Better Copy Committee, Room 1035, 72 West Adams Street, Chicago, Ill.

WOMEN'S COMMITTEE

Miss Sara Harris, *Chairman* **Miss Isabell Davie**, *Secretary*

News Letter

By Mrs. Thelma Van Ness
Publicity Chairman

Miss Marie Reith, a member of the Contract and Inspection Department, The New York Edison Company, New York, has resigned to take a newly created position of Assistant Secretary of the Public Speaking Committee of the New York State Committee on Public Utility Information, and Secretary of the Women's Section of the Empire State Gas and Electric Association. In her new position, she will devote herself primarily to the study of methods in the training of women employees. Miss Reith was the pioneer in women's activities of the Association of Employees of The New York Edison Company, being Chairman of that Committee in 1925 and 1926. In 1927 and 1928, she served as Chairman of the Women's Section of the Empire State Gas and Electric Association.

* * *

According to *The Looking Glass,* reflecting the activities of The Electrical Women's Round Table, Inc., of Greater New York, this group was honored in having an Edison Pioneer, Major Wm. J. Hammer, as the speaker at their October meeting, celebrating Light's Golden Jubilee. Major Hammer was the builder of the first Edison Lighting Company plant in the world. Colonel Hill of the Jubilee Speakers' Committee also addressed the meeting.

* * *

In the September issue of *Memphis Tri-Service News,* Memphis Power & Light Co., Miss Helen Everts reported a very clever method of conducting a demonstration of the Prone Pressure Method of Resuscitation. These Tennessee girls held their Women's Committee meeting at the Shrine Pool and after several swimming and diving contests, a shriek from the shallow part of the pool drew a crowd to that spot. Miss Lucretia Tiffany rescued Miss Ruby Dunagan from a watery grave and placed her face downward on the floor. By that time, the girls realized they were witnessing a Prone Pressure Demonstration. Misses Eva Hood, Mildred Laughter, Lucretia Tiffany, Mabel Hall and Eloise Freeman took turns working on the victim, who gave an excellent imitation of a drowned person and allowed nearly fifteen minutes to elapse before she recovered. Besides the valuable instruction this demonstration imparted to the Committee, this group earned quite a few points in the Southeastern Division Contest, described in the News Letter in the October N. E. L. A. Bulletin.

"Exit Maid, Enter Madame" is the title of the prize-winning playlet, written by Miss Selma Cohn, in a recent contest held by the Memphis Power & Light Co. Formal presentation of the playlet was given at a Women's Committee luncheon at which company officials and their wives were the honored guests. There were eleven girls in the cast and Miss Cohn, the author, acted in the capacity of director. Another playlet, "Say It With Light," written by Miss Anne McLemore, was presented at a Women's Committee meeting. Miss Favo Montgomery is Chairman of this group.

The Women's Committee of the Nashville Railway and Light Co., of which Miss Cullie Clark is Chairman, recently held an essay contest in which Miss Marie Traylor won first prize on an article descriptive of the Nashville steam generating plant and distribution system.

Fourteen essays were written on the subject, "Loyalty" in a contest held by the Women's Committee of the Tennessee Electric Power Company. Miss Lena Grimm, Chairman of the Committee, was awarded first prize. The same group held an essay contest in September on "Light's Golden Jubilee."

The September issue of *The Nela Graph* included in its pages a Women's Section and the feature of these pages was a group of photographs of the five girls of the Southeastern Division who then stood highest in their respective states in the 1929-30 Divisional Contest.

* * *

The San Antonio (Texas) Public Service Company *Broadcaster* reports a very successful initial meeting of the Women's Committee for the season at which Mr. W. B. Tuttle, Company President and Honorary Chairman of the Committee, was one of the speakers. Mrs. Merribel G. Seele directs the activities of this Committee.

* * *

Iowa utility women held a conference in Des Moines in October, the purpose of which was to bring about a more complete organization of Iowa Women's Committees. The meeting was called by Miss Celeste Robinson, Chairman, and both Miss Isabell Davie of N E L A Headquarters and Miss Louise Hathaway, Chairman of the Middle West Division Women's Committee, were present.

The Des Moines Electric Light Company Women's Committee celebrated Light's Golden Jubilee at their October meeting. Mr. Talcott of the Sales Department spoke on Mr. Edison's life and inventions. A lamp campaign is in progress and the girls are demonstrating their ability to sell lamps and break their enviable record of last year.

* * *

The girls of the Madison Office of the Wisconsin Power & Light Co., devoted their September meeting to general consideration of programs for the year, Light's Golden Jubilee, Food Preservation and Lamp Contest activities. Miss Lillian Minch presided. The October program of the Chippewa Falls girls of the Northern States Power Company included a paper by one of the girls, Miss Frances Tarum, on "Chippewa & Flambeau Improvement Co.", a talk by Manager Smith on Light's Golden Jubilee, and a paper by Miss Lillian Wold on "Safety at Home, at Work and on the Street." Miss Florence Card and Miss Ruth Tarum reported on the Milwaukee Women's Conference and the State Contest.

* * *

The Wisconsin Public Service Corporation booth at the Northeastern Wisconsin Fair was one of the main attractions, as Misses Kathryn Heffernan and Zella Patterson, of the Home Service Department, were hostesses. A num-

MAGAZINE ARTICLES

Below is a list of articles which appeared in various magazines recently that are especially interesting to Women's Committee members:

The American Home—December
Lighting the New House in an Old Way—Lurelle Guild
Lights and Shades—Janet Fox Wing
Gifts of Comfort for Both Sick and Well—Phoebe Cole

Good Housekeeping—December
Christmas Lighting — George W. Alder

People's Popular Monthly—December
Getting Acquainted with Your Waffle Iron—Mabel J. Stegner

Delineator—December
Remember the Useful Gifts
Christmas Trees in Your Garden—Ruth Dean

Electricity on the Farm—December

ber of prizes for baking were won by members of the Public Service cooking classes.

* * *

The October number of *Public Service,* published by the Northern Indiana Public Service Company at Hammond, printed a most interesting story by Miss Marion Eckman on her tour of Europe, as one of a group of thirty-five members of the Business and Professional Women's Club. Miss Eckman is secretary to Mr. Morse Dell Plain, vice-president of the company. Mr. Dell Plain was the speaker at the October meeting of the Hammond Women's Committee and his subject was the life of Thomas Edison. The attendance report showed one hundred and thirty-two employees, both men and women, present.

* * *

Recent activities of the Georgia Power Company Women's Committee are reported in *Snap-Shots,* the company publication. The year's program including study classes in first aid and the electric industry, was outlined at the first meeting of the Atlanta Committee in September. Miss Ruth Morris, chairman, who recently returned from a summer course at Columbia University, gave a brief report of her studies and explained her plans for the fall and winter.

* * *

Reports from St. Cloud, Faribault and Red Wing, Minnesota, were included in the September number of the Northern States Power Company publication. Mrs. Mabel Wilson, chairman of the North Central Division, is editor of the Women's Department. Miss Selina Swanson of the St. Cloud office has been elected vice-president of the local Business and Professional Women's Club. The Fairbault girls had a novel evening's entertainment at Wildwood, an amusement park. The Red Wing Committee held a meeting in Wabasha after having visited Alma, Nelson and Cochrane in the afternoon.

* * *

Alabama Power Company girls' activities are reported in *Power-grams,* with Miss Aileen Pierson, editor. At a recent meeting of the Birmingham Committee, Hugh White, of the Alabama Public Service Commission, was one of the speakers. His subject was "What the Public Expects of its Utilities."

* * *

Nebraska electrical women held a State conference at Omaha in October. Miss Alma Jane Hogue is the chairman of this section.

* * *

The State convention of the Kansas Section was held at Hutchinson in October. The outstanding women's activity was the round table, at which over fifty women were present representing the seventeen organized Women's Committees in Kansas. At this convention the girls presented the "Pageant of Light."

* * *

The October number of *Servicescope,* Kansas Gas and Electric Co. was edited by the Women's Committee. There are a number of articles written by the girls and one of the features of the publication is Miss Margaret Van Ness' double-page story of the photoplay, "Hot Shots" which was produced by the Wichita Women's Committee and photographed by Jack Lewis, in charge of Kansas Gas and Electric Company's Cinema Department. Members of the Women's Committee wrote "Hot Shots," edited it, wrote the titles and secured the properties. The plot tells the story of the transformation of the new employee in the utility office, U Tillie Tee, played by "Jack" Winterhalter, from a sophisticated, wise-cracking flapper into a sincere and enthusiastic young business woman.

* * *

Chairman Katherine Winkler of District M, Illinois Northern Utilities Company, reports that Misses Ruth Clark and Marion Allen of the Sterling office, gave a Prone Pressure Demonstration at a Lions Club meeting in October.

* * *

The fourth, quarterly, all-day meeting of the Illinois Northern Utilities Company Women's Committee at Dixon, took place on Oct. 21. The subject for discussion was the use of electricity and gas in the home in connection with cooking processes. Previous meetings stressed lighting, laundering and refrigeration. The principal speaker was Miss Katherine Holy, director, Home Service Department, Federal Electric Company, Chicago. Mrs. Maryan Gonnerman of the Dixon office assisted Miss Holy in her demonstrations. The meeting was in charge of Miss Edna J. Decker.

* * *

Miss Laura Hetherington of the Eastern Division, Oklahoma Gas and Electric Company, has won considerable fame as a window decorator. The clever and artistic displays that have been produced under her supervision have been photographed in order that her company might have a permanent record of these unusual windows.

* * *

Flashette is the title of the Nebraska Power Company Women's Committee bulletin, published at Omaha. Miss Lucille Hickey is the editor. An October issue announced the organization of a new Women's Committee in the Citizens Power & Light Co. territory with Miss Marion Headly holding the office of President. Miss Madeline Bohlsen of the Nebraska Power Company gave a lecture before the Home Mechanics Class at the Y. W. C. A. on the topic, "Care and Use of Electric Appliances in the Home."

* * *

A feature of the Women's Committee programs throughout the National Electric Power Company system was the pageant, "The Evolution of Lighting," according to *The Stimulator.* Lamp shade classes have been conducted by the Women's Committee of the Public Service Company of New Hampshire, under the direction of Miss Grace A. Phillips, company chairman, and Mrs. Marion C. Lander, State chairman. The members are given the materials with which to make the lamp shades and under Mrs. Lander's guidance they complete them within a certain period of time. Especially successful classes were held in Manchester in September and in Nashua, Keene and Laconia in October.

* * *

The Chatterbox is the name of the bulletin broadcasting the activities of the Tampa Electric Company Women's Committee in Florida, Mrs. Noma Jefferson, editor, and Mrs. Marguerite Roose, chairman. The girls of this group are busy with a tableau, "The Evolution of Lighting" to be presented at a meeting of the Tampa Electrical Benefit Association.

* * *

The Virginia Public Service Company Girls' Club activities are published in the company publication entitled, *The Office Crier.* This group held a luncheon meeting on Oct. 21 celebrating Light's Golden Jubilee, with all members present as well as a number of guests. These girls are busy in a stock sales contest.

* * *

The Women's Committee of Puget Sound Power & Light Co. holds weekly first aid classes. Miss Nell Marks and Mrs. Nell Laws of this company attended the Business & Professional Women's Club Birthday Banquet and Conference at the Hotel Vancouver, B. C., in September. They met there members of the Company Women's Committee from Bellingham, Mount Vernon and Bremerton. Miss Dorothy Chase, of the Bremerton office, is president of the Bremerton Business and Professional Women's Club. Members of the Seattle Women's Committee were responsible for the program at the local

Business and Professional Women's Club meeting on Oct. 22, celebrating Light's Golden Jubilee. Women's Committee members were invited.

* * *

Unusual recognition has been given Miss Mabel MacFerran, mathematical genius of the Southern California Edison Company. The story of Miss MacFerran's achievements, as reported in the Los Angeles *Examiner*, was mailed to all the stock holders of the company with their October dividend checks. This young woman, a full-fledged electrical engineer, with degrees from three universities, operates the system calculating board which reproduces the whole system in miniature. The Edison Company discovered Miss MacFerran after she had taken her third degree from the Department of Dr. Harris B. Ryan, famous electrical scientist of Stanford University. Before that she had been graduated from the Massachusetts Institute of Technology, specializing in physics, mathematics and electricity. Then she took a post-graduate course in high voltage research at Stanford and won the Elwell Fellowship that gave her the course with Dr. Ryan. Through her unusual ability and thorough knowledge of the fundamentals of electrical engineering and her marvelous grasp of its mathematics, Miss MacFerran steadily advanced to the position she holds today, the operating engineer's technical assistant.

Other news items from this company, as reported by Mrs. Jeanette I. Rees, chairman, include an appliance questionnaire upon which the girls worked in October. After being judged by a committee composed of a number of department heads, prizes were awarded at the November meeting, a feature of which was a demonstration of an electrically cooked dinner. The dinner itself was to be one of the prizes, a waffle iron and toaster to be the second and third prizes.

This committee is preparing for their annual doll contest to be held during Christmas. Ninety-six dolls have been distributed and will be turned in, dressed in accordance with the rules of the contest, by Nov. 30. Miss Nina Leonard is chairman of the Doll Committee. The dolls will be distributed at Christmas time to the needy children of the city.

* * *

The Women's Luncheon Club of the San Joaquin Light & Power Corp., at Fresno, Cal., celebrated Light's Golden Jubilee by joining the Ad Club and the Exchange Club in a noon luncheon at the Hotel Californian, Oct. 21, with Al Joy of the Power Company as the speaker.

Mrs. Anna Steese Richardson, director of the Good Citizenship Bureau of the *Woman's Home Companion,* was the incentive for a public meeting in the San Joaquin Light & Power Corporation Auditorium at Fresno recently. The subject of her address was "Whither Go Women?"

* * *

A feature of the last meeting of the Lincoln *Live Wires,* the Iowa-Nebraska Light & Power Co., was a talk on the proper use of the telephone by Miss Lula Rumery of the Lincoln Telephone Company. In connection with this an illustrated skit was presented by Misses Littie Hudson, Maurine Smith and Elsie Pierson. The plot was taken from an actual experience in the Order Department of the organization.

* * *

The September issue of *The Broadcaster,* of New Orleans Public Service, Inc., was edited by the girls. This is the second number published by the Women's Committee and is a magazine filled from cover to cover with interesting stories, articles and news items. Miss Julie Pailet of this company is the Southwestern Division Chairman and her efficiency contest is one of the outstanding activities of its kind.

* * *

The Middle West Division Women's Committee, of which Miss Louise Hathaway of the Iowa Railway & Light Co., Cedar Rapids, is chairman, has set up a seven-point program which is very interesting.

Miss Alma Jane Hogue is the Nebraska State Chairman. In her committee each member is responsible for certain territory, four girls acting as sponsors for the different companies in the specific district assigned to each.

Why Women in Our Industry?

By ALMA JANE HOGUE

President, Women's Division Nebraska Power Co.
Chairman, Women's Committee, Nebraska Section N. E. L. A.

I HAVE just enough what you might call "nerve" to believe that the electrical industry needs women employees. However, I will modify this somewhat by stating that the executives should not have us in their organizations if they don't have confidence in us and in our place in the industry. Since the women employees are in the industry, then why not get the most good out of them, that's why women's divisions were organized.

Women's divisions were organized also because executives realized that the women needed encouragement and stimulus. Women's divisions in our industry are not merely local organizations. National leaders have recognized this type of employees' organization as very important in developing the women employees as greater assets of our business.

All over America women's division organizations are springing up like mushrooms. Thousands of women employees of our industry are now receiving inspiration in becoming more valuable representatives of our public utility business. Right here in Nebraska, where at the present time we have only seven organized women's divisions, steps are being taken to organize six more, giving us a total of thirteen organized divisions in Nebraska.

These divisions aim not only to inspire women employees to more efficiency in the offices and other departments of their respective electric companies, but they aim to furnish these women employees with information so that they can discuss intelligently with the other women with whom they come in contact, the many, varied and intricate problems of our industry.

Once a famous politician said, "Give me fifty women who can spread information, and I will give you fifty newspapers." No one will deny that we women love to talk. That is why the women's divisions aim to furnish their members with proper information and inspiration so that the women can spend their time talking intelligently about the electrical business.

Not only does the women's division aim to make the women employees "good talkers" for our industry and our respective companies but it aims, also, to make us "good do-ers." It aims to inspire our women employees with loyalty, efficiency in daily duties, and elimination of waste both in time and materials.

Any women's division, given the proper opportunity of service and the proper supervision, can save in dollars for an electric company many times the amount expended for the operation of that division. Not only will it save dollars for the company, but it will give to the women employees more SENSE—the industry's sense of greater service to our customers.

The women of our industry have no fear that the men will hold them back. There is a definite place for women in our business, and with the proper encouragement and inspiration from the executives, the women cannot help but do their share in creating greater kilowatt-hour consumption and better public relations.

WHAT OCCURRED LAST MONTH

Agricultural

The standard rural electrification plan, which has been prepared by a Special Commission on Rural Electrification, has been accepted by a large number of the electric companies of Virginia. The plan standardizes the system under which rural communities and farms may make connections with power-lines at a reasonable cost. Under the plan, a minimum periodical rate for current is established for rural consumers.

* * *

The Public Service Commission of Georgia has issued an order cutting in half the cost to consumers of extensions of electric service into rural sections.

* * *

The Public Service Commission of the Province of Quebec, in cooperation with engineers of several of the largest hydro-electric companies, is making an intensive study of the problems of promoting the use of electrical energy on the farms of the province.

* * *

Colorado River Project

Senator Smoot of Utah has introduced a bill calling for construction by the Interior Department of a dam and power plant on the Green River in the Flaming Gorge of Horseshoe Canyon, Utah, at a cost of not more than $18,000,000. The project includes flood control, improved navigation and production of about 40,000 horsepower. An initial appropriation of $20,000 for surveys is included in the bill. Conditions similar to those of the Swing-Johnson bill requiring contracts for power to pay the cost of the project are included in the Smoot bill.

* * *

On November 9, Governor Dern of Utah issued a statement setting forth a protest against the sale of Boulder Dam power at 1.63 mills per kilowatt-hour, adopted by the Colorado River Commission of Utah at a meeting held with Governor Dern. The protest contends that the 1.63 mills rate would be less than competitive and holds that the cost of current should not control the selling price, except to the extent that it should be adequate to provide for repayment of costs, but the price should be controlled by competition. The protest further maintains that the charge of 25 cents per acre-foot for storage of water for the Metropolitan District of Southern California is too low. It is further declared that the price of 1.63 mills would injure the California market for Utah coal. The Utah Commission holds that there should be no government subsidy in fixing the price for current, but surplus earning should be spent for development of the resources of the entire Colorado Basin.

* * *

On November 12 the Colorado River Development Commission of Nevada submitted to Secretary Wilbur a bid for power to be developed at Boulder Dam. The Commission offers to take all of the "firm" power and says that it is prepared to install and operate the power-plants and to furnish satisfactory guarantees for proper financing. It offers a price of 1.75 instead of 1.63 mills per kilowatt-hour for "falling water." The Commission holds that Nevada is entitled to one-third of the power. It says that it does not want to appear to be seeking to acquire more than Nevada's rightful share, but bids for the whole amount in order to dissipate the theory that it is necessary to make any concessions to certain organizations or areas. Senator Oddie of Nevada has written to Secretary Wilbur in support of Nevada's claim.

* * *

Hearings on the proposed allocation of power to be generated at Boulder Dam were begun on November 12 at the Department of the Interior, with Secretary Wilbur presiding. Nevada was the only state represented at the November 12 hearing by a delegation, but a number of cities, towns and districts were represented. Written statements from those having protests against the proposed power-allocation were submitted. Protests in behalf of Nevada were voiced by Senators Pittman and Oddie. They claimed that Nevada should be granted one-third of the power developed and objected to having Nevada contract at the outset for all power that it would need in the future without authority to dispose of surplus power to companies of municipalities outside the state.

Representative Swing of California said that California should not be expected to carry the unused power of another state while such state was undergoing a development and then be required to permit such other state to regain the power later.

* * *

On November 13, W. B. Matthews, attorney for the Los Angeles Bureau of Power and Water, urged that transfer of authority over the operation of the Boulder Dam power project be made to the City of Los Angeles. He contended that if private corporations would not be satisfied with the power allocated to them without having a share in the operation of the plant, then Los Angeles and other districts and municipalities could use the entire output of the power developed by the Dam. Other representatives of Los Angeles spoke in a similar way.

* * *

At the November 14 hearing at the Department of the Interior, Senator King of Utah requested that Utah be allotted a share of the power generated at Boulder Dam up to 50,000 horsepower. L. Ward Bannister, representing Denver, stated at the same hearing that he had filed a statement on behalf of Denver requesting reallocation of power. In closing the hearings on November 14, Secretary Wilbur made a brief address appealing for agreement and cooperation.

* * *

The Southern California Edison Company has filed a written protest with the Secretary of the Interior against the proposed allotment of Boulder Dam current. The company claims that the tentative allotment is not in proportion to the needs of the applicants and says that it should be logically granted a larger proportion. Public Utility Companies supply more than four-fifths of the electric energy for the population and industries in the territory in question while municipal agencies supply less than one-fifth, the company's statement says.

* * *

A telegram from Secretary Wilbur to Governor Phillips of Arizona in regard to Arizona's protest concerning the allocation and price of Boulder Dam power says that the rate was fixed in accordance with the recommendations of electrical experts employed by the government and provides sufficient revenue to pay in 50 years for the dam and power house with interest and substantial yearly payment to both Arizona and Nevada. A reply sent by Governor Phillips declares that Arizona has always denied the validity of the Swing-Johnson bill, but hoped to arrange a compact with California and Nevada which would enable Arizona to accept the bill. Governor Phillip's reply also declares that the price fixed for power is not on a competitive basis and the price for storage of water for southern California is only nominal and noncompensatory.

* * *

Consolidations

The Associated Gas and Electric system has announced acquisition of the American Utilities Company, controlling properties valued at more than $10,000,000 in Missouri, Kentucky, Tennessee, Louisiana and eight other states.

* * *

Plans for consolidation of the Stanford Gas and Electric Company and the Connecticut Power Company, with combined assets of about $26,000,000 have been announced.

* * *

The United Gas Improvement Company has purchased the Commonwealth Utilities Corporation, the headquarters of which is in St. Louis.

* * *

The electric systems serving Port-au-Prince and Cap-Haitien, the principal cities of Haiti, have been added to the system of the Southern Cities Utilities Company which, a few months ago, acquired the public utilities formerly operated by the Dominican Republic.

* * *

A report from Rockville, Connecticut, says that control of the Rockville-Willimantic Lighting Company has passed to the Connecticut Electric Service Company.

* * *

The Utilities Power and Light Corporation has made formal application to the Missouri Public Service Commission for permission to acquire additional stock of the Laclede Power & Light and Laclede Gas Light Companies which operate in St. Louis and vicinity.

* * *

Acquisition of a controlling interest in the Columbus, Indiana Gas Light Company by the Midland United Company, an Insull holding company, has been announced.

* * *

The Utilities Power and Light Corporation of Chicago has purchased the Suburban Light and Power Company of Alliance, Ohio.

* * *

The Alabama Power Company announces the purchase of properties of the Gulf Utilities Company, located in a number of small cities in Alabama.

* * *

Earnings of Utilities

The Department of Commerce announces that an increase of 17.5% in gross earnings of public utility enterprises, exclusive of telephone and telegraph companies, is reported for the first eight months of 1929, as compared with 1928. For the period covered in 1929, 95 companies operating gas, electric, heat, power, transportation and water services, report earnings of $651,500,000 as compared with $554,432,512 for 1928.

* * *

Foreign

The Amtorg Trading Corporation, controlled by the Soviet Government, announces that an increase of 403,500 kilowatts in the capacity of power plants in Russia is contemplated during the coming year. Of this 223,000 kilowatts will be generated in new plants to be completed during the year and the remainder will be accounted for by expansion of existing plants.

* * *

Hydro-Electric

The Oklahoma Commission on Drainage and Irrigation has granted to the Grand Hydro Corporation a permit to develop a hydro-electric plant on the Grand River in northwestern Oklahoma, capable of producing 40,000 horsepower.

* * *

A commission of three engineers and three geologists has been appointed by the State Engineer of California to investigate the safety of the San Gabriel Dam, which is being constructed by the Los Angeles County Flood-Control District. Work on the dam, whose ultimate cost is estimated at $25,000,000, was stopped when adverse reports about the foundation were made by geologists.

* * *

The Federal Power Commission on October 30 and 31 and November 6 continued its hearing on applications for development of hydro-electric power on the Flathead site in Montana. The Rocky Mountain Power Company, subsidiary of the Montana Power Company, and Walter H. Wheeler, a Minneapolis engineer, are the applicants.

* * *

The Pacific Gas & Electric Company is building at Salt Springs on the Mokelumne River, near Sacramento, what is said to be the largest rock-fill dam in the world. When completed, it will be 330 feet high with a crest length of 1,300 feet, a base width of 960 feet, and will contain 3,000,000 cubic yards of granite quarried near the site. It is expected to produce 33,500 horsepower. This is the first unit of a $25,000,000 program of hydro-electric development being put through by the company.

* * *

The Federal Power Commission has authorized a license to Hyrum City, Utah, for an $80,000 power and light project in Blacksmith Fork Canyon. The California-Oregon Power Company of San Francisco has applied to the Federal Power Commission for a license to construct a dam on Rogue River, near Gold Hill, Oregon, which would have a capacity of about 1,600 horsepower.

* * *

At the last session of the Nebraska Legislature a Commission was created to find locations for dams for flood control and creation of hydro-electric power. The Commission appointed engineers to investigate, and these have reported three advantageous dam sites on the North Platte River.

The Safe Harbor Water Power Corporation has let the contract for construction of the dam and power house of the great hydro-electric development at Safe Harbor on the Susquehanna. The first installation will be about 230,000 horsepower.

* * *

The Federal Power Commission is making an economic survey of the need for electrical power in Washington, D. C, and vicinity in the course of preparing for Congress its report on the applications for preliminary permits to examine the possibilities of power-development at Great Falls on the Potomac.

* * *

The annual report of the Federal Power Commission was issued on Nov. 25. It discloses that 1929 will set a new high record for production of electric current and forecasts continued expansion of the electrical industry. The report says that during the past ten years the proportion of the country's electric energy requirements generated from water power has fluctuated between 34 and 40 per cent of the total, with no definite trend toward either steam or hydro-electric production indicated for 1929, on account of the drought, the percentage of current generated by water power has been largely reduced.

The report questions that the purpose of the Federal Water Power Act has been fully achieved in view of the fact that water resources have not been as rapidly developed as they might have been. It declares that the commission favors State rather than federal control of utilities. On the Colorado Basin situation, the report indicates that some applications for power development not interfering with the Boulder Dam project may soon be taken up.

* * *

A license to the Sierra and San Francisco Power Company for a project on the Stanislaus River, Cal., has been granted by the Federal Power Commission. The plant will have an average annual output of 113,000,000 kwh.

* * *

Municipal Plants

A survey just completed by the Nebraska Public Utilities Bureau shows an increase in the trend away from municipal ownership and operation of electric plants. During the year ended October 1, 1929, 48 plants were purchased by the interconnected systems, 40 of them from municipalities, and in practically every case a substantial reduction in rates followed.

* * *

On October 22, the people of Junction City, Kansas, defeated a proposition to issue $425,000 in bonds for the building of a municipally-owned electric plant.

Rates

The Keystone Public Service Company, of Oil City, Pennsylvania, has announced reductions in residential rates in Oil City, Franklin, Titusville and surrounding territory. The annual saving to consumers will be $41,000.

* * *

The Mississippi Power Company, which serves about 150 towns, announces a rate reduction of about 8 per cent on electricity used for lighting and other ordinary purposes. This means an annual saving to consumers of between $200,000 and $250,000.

* * *

The City of La Grange, Georgia, announces lower electric and water rates to customers of the municipal plants.

* * *

A new schedule of rates announced by the Bureau of Water and Power of Los Angeles, reducing charges to consumers by about $1,100,000 a year, has been approved by the Los Angeles City Council through passage of an ordinance. The Los Angeles Gas and Electric Corporation announces a corresponding reduction in rates which will amount to $800,000 per year. The new rates will become effective on January 1.

* * *

The United Electric Light Company of Springfield, Mass., has announced a new rate schedule for the use of electricity by stores, which will mean a saving of $35,000 a year.

* * *

The Public Service Commission of Georgia has announced a new schedule of commercial rates for the Georgia Power Company applicable in Atlanta and 228 cities and communities. The rates become effective with the meter readings of December. They will result in both increases and decreases to individual customers, but are to be applied universally to all customers of the company taking the same class of service throughout the state, and will result in an aggregate decrease in revenues of more than $200,000 annually.

* * *

The Pacific Gas & Electric Company and the Western Electric Company on Nov. 7 filed with the California Railroad Commission a voluntary reduction of rates.

* * *

The Mountain States Power Company of Albany, Ore., has reduced commercial and residential rates to the amount of $30,000 annually.

* * *

Regulation

On Nov. 8 the United States Senate adopted a resolution directing the Federal Trade Commission to investigate and report to the Senate the amount of interstate transmission of electrical power, whether transmitted between the same or different companies, the names of the concerns and the relation between the amount of electrical energy consumed in a State and the amount produced therein. Senator Couzens, Chairman of the Senate Committee on Interstate Commerce, and author of the bill proposing a Federal Commission on Communications and Power, introduced the resolution.

The Public Utilities Commission of Connecticut has adopted a resolution opposing the Couzens bill which provides for a Federal Commission on Communications and Power.

* * *

The Public Utilities Commission of Colorado and the Railroad Commission of Kentucky, which occupies about the same position in Kentucky as Public Service Commissions in some other States, have adopted resolutions against the Couzens bill.

* * *

The Board of Railway Commissioners and, ex-officio, the Public Service Commission of Montana have adopted a resolution opposing the Couzens Bill. Mention is made in the resolution of similar opposition expressed in a resolution adopted by the National Association of Railroad and Utilities Commissioners.

* * *

The Supreme Court of New Jersey, on Nov. 15, handed down a decision sustaining the right of a public utility to refuse to furnish electric current to the owner of an apartment house to a master meter for resale to tenants for the profit of the apartment owners or the meter company.

* * *

The Federal Trade Commission announced on Nov. 20, that, as a result of the resolution passed by the Senate, it would immediately undertake inquiries into the interstate transmission of electrical current.

Amplifier Talks

(*Continued from page* 768)

20 years ago, these new classes of engineers have an infinitely better training, more thorough knowledge and wider views. This fact alone is sufficient guarantee of future progress and still further improvements."

Expanding on this subject enthusiastically, he said: "The United States of America and its business interests have acquired through the war, more rapidly than would have otherwise been possible, a tremendous wealth which allows them to deal not only with their own national, financial, commercial and political problems, but which induces them to have and to defend foreign interests. This means to me that the States, being one of the world's leading nations, must lead not only through money and material power, but in an intellectual way as well. To do this, your nation needs an army of well schooled and finely educated men. A serious improvement and a great step forward can easily be recognized by those who compare today with 18 years ago. The road of educational and social matters which you have been traveling is a splendid one, and I am sure you will keep to it with constantly increasing effort. A great nation needs many finely bred, well trained, highly educated men, and the more there are the more easy will be the accomplishment of your tasks."

Speaking of the difficulties which many scientists often encounter because of the fact that they are faced with the necessity of solving the problems of the material requirements of living, he said: "A nation as rich as the United States owes it to itself to help in research work. The efforts made in this respect by the great electrical and chemical manufacturing companies are certainly remarkable, but I am pleased to note that you are going further—that the President of the United States, Mr. Hoover, in recognition of this necessity, has promoted the creation of a Research Fund which will provide an annual income of at least two million dollars to establish National Research Professorships and in other ways to cooperate with universities and other institutions which are prepared to do their full share in the encouragement and support of fundamental research in the mathematical, physical and biological science. This news is the more pleasant when one learns that the light and power companies are supplying two million dollars to this fund and the electrical manufacturing companies another million."

Apparently the present E. O. Meyer, successor to the young idealist of twenty years ago, has not been "disenchanted." One might express the wish that more distinguished guests from the other side of the Atlantic would approach the United States with such an open mind and would make use of the time they may spend here as intelligently. Visits by men of this high calibre cannot help but advance the cause of international cooperation as well as a very real and lasting friendship between two such nations as France and America.

LEGAL DECISIONS from RATE RESEARCH

EDITOR'S NOTE: The N. E. L. A. BULLETIN carries each month brief comments on some of the leading cases reported by *Rate Research* as coming before either State or Federal courts or Public Service Commissions.

Indeterminate Permit Invalid in Oklahoma

THE Constitution of the State of Oklahoma contains about 400 paragraphs and occupies at least 100 printed pages. A great many matters generally provided for by statute in other States are part of this constitution—unchangeable except by constitutional amendment.

In 1925 the Oklahoma legislature passed an act providing for the surrender of limited term franchises and the taking out of indeterminate permits of a somewhat qualified nature in lieu thereof, and also providing for certificates of convenience and necessity. The legality of the law was at once challenged under the Oklahoma Constitution and has now been held invalid by the Supreme Court of that State in the case of Okmulgee v. Oklahoma Natural Gas Corporation (*Rate Research,* vol 35).

Constitutional Provisions in Oklahoma

A number of constitutional provisions were discussed in connection with the validity of this act, such as the initiative and referendum; the provision against construction and operation of a street railroad without consent of the local authorities: but the ones upon which the decision turned were those providing that no municipal corporation should ever grant, extend or renew a franchise without the approval of the majority of qualified electors within the corporate limits; the provision inhibiting exclusive franchises; and section 5A, article 18, which provides that "no franchise shall be granted, extended or renewed for a longer term than 25 years."

It was claimed that while these provisions might be limitations upon the power of the municipality they were not limitations upon the power or authority of the legislature in the matter of granting franchises. The Supreme Court held they were limitations upon the legislature as well as upon the municipalities and hence the indeterminate permit law was invalid.

It must be remembered that the Constitution of Oklahoma was adopted in 1907, the year in which State regulation of utilities in its present form had its inception in the States of New York and Wisconsin. The economic principles underlying regulation were then not generally understood, and the bearing of short term franchises on such regulation and public welfare but little appreciated. Although the indeterminate permit law had its origin in Wisconsin in 1907 it was not until several years after that the nature of such a franchise was understood and, as a matter of fact, the merits of the indeterminate permit have only in recent years been fully appreciated. Yet the Oklahoma Constitution adopted over 20 years ago inhibits a form of franchise the merits of which are generally conceded by all serious students of economics.

The decision does not in and of itself pass upon the merits of the indeterminate franchise and expressly refrains from passing upon the policy of providing for indeterminate permits. The opinion, which is lengthy, is devoted to a discussion of the applicability of the various constitutional provisions in Oklahoma to the legislative act of 1925.

The decision, therefore, while very important within the State of Oklahoma, is perhaps most important as an illustration of the disadvantages of covering matters not fundamental by rigid constitutional provisions which generally might better be left to the wisdom of legislative enactment so that the legislature can act wisely from time to time as changed conditions and experience warrant.

The constitutions of one or two other States provide for a 20 or 25 year limitation upon franchises, but generally such provisions, where they now exist, are legislative and may be repealed by the State legislatures. Even in the one or two cases where such limitations are found in the constitutions, it does not follow that the construction of the Oklahoma Constitution would be applicable.

Municipal Business Proprietorship

THE Supreme Court of Oregon, in holding that a city was authorized to sell electric energy outside its limits and that a State statute excepting municipally owned utilities from regulation by the public service commission was not unconstitutional, upon rehearing said among other things: "Much of the brief is taken up with discussion of the economic results that would follow an adherence to our original opinion and to a certain extent we agree with counsel in the view that participation by the municipalities in enterprises such as furnishing water or electric lighting outside of its municipal limits is not in accord with sound economics or public policy, but states and municipalities often engage in activities which, while not prohibited by their constitutions or charters, are unsound and sometimes disastrous" (35 *Rate Research* 309).

Free Service to City Officers

THE City of Roswell, N. M., owns its own water works plant and has been giving free service to the officials of that city. In a recent decision by the Supreme Court of that State (35 *Rate Research* 339) the Supreme Court held that such practice was illegal.

An interesting part of the decision is that it was not based upon any specific statute but upon general principles. The city claimed the right to do what it pleased with the water, but the Supreme Court held that the city was a trustee for the inhabitants and could not make a gift of city property unless it could show authority in law.

Revenues from Merchandise Part of Utility's Income

THE California Railroad Commission in ascertaining the return on the value of a utility property, has just ruled that miscellaneous jobbing and merchandising revenues should be considered as part of the operating income in a rate proceeding. Among other things the commission said: "The same quarters and the same employees are used to carry on this branch of the business; it is a mere incident of the business and is used to attract business; and the expense of conducting it are largely absorbed in various operating expense accounts. It is neither practicable nor reasonable to set this activity of the utility off by itself" (35 *Rate Research* 323).

Eminent Domain

IT is a well understood principle of law that the power of eminent domain does not extend beyond the State limits and cannot be used solely for the benefit of another State.

United States District Court for the Northern District of Indiana holds that the power of eminent domain can be exercised within that State although the purpose thereof may be also to make electricity available in another State. "It should also be kept in mind that this right to condemn will not be refused merely because the peoples and communities of another State will be likewise benefited" (35 *Rate Research* 329).

Rate of Return

United States District Court for the Western District of Kentucky has ruled that any return less than 8 per cent would not be fair and reasonable. (35 *Rate Research* 312).

Picked up from

ELECTRICAL NEWS ITEMS

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Domestic Rates Steadily Decreasing

ACCORDING to the statistics for the electric light and power industry, issued for September by the Statistical Research Department of the National Electric Light Association, the downward trend of the average price of domestic electric service is steadily continuing.

Taking the United States as a whole, the average for the twelve months ending with Sept. 30 was 6.30 cents per kw-hr. This compares with an average of 6.40 cents for the period ending with June 30 with 6.50 cents for the period ending with March 31 and with 6.55 cents for the calendar year of 1928.

According to the present trends, the final average for the whole year of 1929 will be in the neighborhood of 6.2 cents per kw-hr., a decrease of more than five per cent during the year.

Coincidently with this progressive decline in the average rates, the amount of electricity used by the average customer has shown a steady increase. During the twelve months ending with Sept. 30 the average for the United States as a whole was 487 kw-hr., as compared with 459 for the calendar year of 1928. For the entire year of 1929, present trends indicate an annual use of 500 kw-hr.; an increase of 41 units per consumer, or of nearly nine per cent over 1928.

The Guest Is Amazed

THE Missouri *Utility News* says that a guest at a recent demonstration illustrating laboratory achievements by electric and telephone engineers was amazed when:

He "heard" a picture of President Herbert Hoover.

He heard a speechless man "speak."

He saw a deaf man "hear."

He heard the power of 500,000 times 50 strong-lunged men's voices shout the words of one man.

He heard his muscles move, with a sound like thunder.

He telephoned his photograph.

He learned it is possible to gaze at a scene many miles distant.

He heard speech "scrambled" as a cook scrambles eggs.

He heard the top third, bottom third and center third of a strain of music.

He danced to "upside down" music and heard speech "upside down" and "right side up" at the same time.

He was looked over by an electric eye.

He saw and heard speech "take a rest" on the route from lip to ear.

He talked into a telephone and then walked over to the other end of the line and listened to his own words four seconds after speaking them.

He heard the music continue after a phonograph record had stopped playing.

"Such is modern progress," says the *Utility News.* "Many of these things may be commercially perfected within a comparatively short time. Indeed, it may be possible for us to sit in our homes and enjoy some of these remarkable developments a few years from now."

Mr. Vanderbilt and Mr. Edison

THE New York *Herald Tribune* recently published an amusing story concerning the first electric meter constructed by Mr. Edison. It seems that in the early stages of electric lighting, Cornelius Vanderbilt was among the first to have his house wired. The service charge for lighting in those days was based entirely on the number of lamps installed and not in terms of the actual amount of energy consumed. Mr. Vanderbilt did not think this was fair, and, sending for Mr. Edison, he poured forth his woes. The conversation, according to the *Herald Tribune* was as follows:

"I believe that I am being overcharged for the amount of electricity that I use," ventured Mr. Vanderbilt.

"How so?" asked Mr. Edison.

"Why you charge solely on the basis of the number of lamps that I had installed and I rarely have more than half of them turned on at any one time. Besides, I don't see how you can tell how many hours I have had any of them burning."

"Quite so; but suppose I install an apparatus that will tell me how many lamps you have used and how long they have been burning?"

"Impossible," retorted Mr. Vanderbilt.

"We'll, I'll make a wager with you," persisted Mr. Edison. "I'll bet at the end of next month I will be able to tell you the number of lamp hours of electricity you have used."

The wager was made and Mr. Edison devised the first convenient electric light meter, which made use of the deposition of copper on a plate. The plate was weighed before the test and then again after the test. The difference in weight was determined, and, knowing the electro-chemical equivalent of copper, the amount of electrical energy consumed could be accurately calculated.

Mr. Vanderbilt instructed all of the servants in his house to keep a careful check on how long each lamp was burned. He was quite shocked when he discovered that both results were almost identical.

Moonlighting

"MOONLIGHTING," a new development in the science of illumination, has been introduced in lighting the exterior of the new Museum of Fine Arts in Cleveland. It differs from the usual floodlighting of buildings in that the light intensity is but little brighter than the light from a bright full noon, or about the equivalent of a clear moonlight as seen in the rare atmosphere of the southwest.

"This moonlight is just the proper intensity to harmonize with the refined architecture of the museum, and it lends that quiet repose and dignity desired in the surroundings of buildings of this character," says J. W. Gosling, of the General Electric Company. "A picture in reality, like the setting on a great stage, it is really one of the most charming sights, from an artistic point of view, that I have ever seen." (*See Frontispiece.*)

Steel Sound Recorder for Movies

THE recording and reproduction of sound on steel by electromagnetism is the latest product of the laboratories of the talking motion picture industry, according to the *Electrical Times* (London). It is known as the Blattnerphone and is now being demonstrated at the studios of the Blattner Picture Corporation at Elstree.

The Blattnerphone is the application of electro-magnetic control to the talking film. Instead of a disc or film strip, steel tape is used, on which the sound is recorded. The recording is "positive," so that the tape can be used immediately for reproduction or for the making of an unlimited number of copies. It is stated that this steel tape is practically invulnerable; that it may be handled and transported, and can be passed through the machine a thousand times without developing wear or disturbing noises. It is also claimed that in comparison with the "sound-on-strip" method, the cost is less than one-fiftieth for the same time duration of recording and reproducing.

THE REVIEWING STAND

See News Letters from Geographic Divisions in "Geographic Divisions and State Associations" section for listing of publications of the several divisions during the year.

Interstate Transfer of Electric Power in 1928

N. E. L. A. Pub. No. 019. Statistical Bulletin No. 4 of Statistical Research Department N. E. L. A., 8 pp.

THIS study shows that 89.27 per cent of the total electric power consumed in the United States in 1928 was produced within the State of consumption, and consequently did not cross State lines.

The remainder, or 10.73 per cent, of power consumed crossed State lines on its way to market and is consequently involved in interstate movement.

Approximately two-thirds of the interstate power arises from the operation of thirty major generating plants separated from their normal power markets by State lines because of economic consideration or location of waterfalls. Such plants are the Conowingo, Keokuk, Cahokia, Holtwood, etc.

Analysis has been made of the 10.73 per cent of electric power crossing State lines from the standpoint of regulation.

Two-thirds of all interstate power, or 6.62 per cent, of power consumed, designated as "Direct Distribution," is power generated in one State and distributed to consumers in another State by the same company. The rates at which this power is sold to consumers are now within the jurisdiction of the State and will remain so unless and until the Federal government exerts its superior authority.

The remaining 4.11 per cent of total power consumed, designated as "Wholesale Transactions," is generated in one State and sold to another company in another State for distribution. These transactions are exclusively within Federal jurisdiction so far as concerns the direct regulation of the wholesale rate, although the rates which may be charged the ultimate consumer are subject to control by State authority.

The relative proportion of power in interstate movement to total consumption has increased from 8.99 per cent in 1926 (Harvard Study) to 10.73 per cent in 1928. Practically all of this increase has been due to the placing into operation of three major developments during this time—Conowingo, Md.; Bellows Fall, Vt., and Sterlington, La.

The study indicates that the distance traversed by the average kilowatt-hour in its path from power house to customer in the United States is only about 22 miles. If the long-distance bulk transmissions of the Pacific Coast are excluded, the average distance traversed is only 18 miles.—*P. S. C.*

Operating Methods Overhead and Underground Primary and Secondary Distribution Systems

Report, Overhead Systems Committee, N. E. L. A. Publication No. 03, 24pp. (illustrated). Price, 40 cents; to members, 25 cents.

THE best practice in operating methods of overhead and underground primary and secondary distribution systems is given in this report. The data are based on replies to two comprehensive questionnaires: the first dealing with operation of the overhead distribution feeders, including primary and secondary systems and transformers; and the second questionnaire on the operation of the underground distribution feeders, also including primary and secondary systems and transformers. All figures and conclusions relative to underground practice are based on the analysis of communications received from 31 operating companies. Data on the overhead distribution systems are based on replies of 39 companies.—*E. S. B.*

Cable Installation

Report, Underground Systems Committee, N. E. L. A. Publication No. 02, 16pp. (illustrated). Price, 30 cents; to members, 20 cents.

VARIOUS methods of installing cable in underground conduit systems in suburban sections with reduced capital expenditures are outlined. New practices or equipment used in underground cable and additional information on duct lubrication and pulling stresses are included.

Cable reel standards, as adopted by the Insulated Power Cable Engineers Association and approved by the Underground Systems Committee is given for reference, as is also a summary of reports from member companies on the reuse of withdrawn cable.—*E. S. B.*

Casualty Insurance for Gas and Electric Utilities

Report, Insurance Committee, N. E. L. A.* Publication No. 016, 12pp. Price, 25 cents; to members, 15 cents.

CASUALTY Insurance is treated as it affords indemnity against

1. Direct loss or damage to property.
2. Liability for claims for death or personal injury.
3. Damage to property of others, resulting from accidents or casualties.

Principal policy forms of interest to public utilities which protect against claims made upon the assured because of his legal liability are outlined and discussed. Examples of forms of insurance which usually cover both direct loss to the assured and his liability to others, are included along with other forms of casualty insurance which usually only cover direct loss and damage to the property of the assured. A bibliography on casualty insurance concludes the report.—*E. S. B.*

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*Prepared in cooperation with Insurance Committee, American Gas Association.

Report of Insurance Committee A. G. A. 1929

Copies of this report may be procured through the N. E. L. A. Insurance Committee, from the Sales and Order Department of N. E. L. A. Headquarters or directly from the American Gas Association, 420 Lexington Avenue, New York.

THE Insurance Committee of the National Electric Light Association invites attention to the 1929 Report of the Insurance Committee of the American Gas Association with the thought that it contains many ideas and suggestions which may be useful to electricity supply companies.

The A.G.A. report contains the latest information on such items as insurance on deferred payments on merchandise, the 90-day limited automatic clause, the inherent explosion clause, and other matters of current interest. It also contains among other recommendations the Report of the Insurance Records Subcommittee which should be directly useful to the Accounting Departmemnts of electric utilities.—*A. M.*

Selling Electric Ventilation

Special Report, General Power Committee, Commercial and Industrial Power and Heating Bureau, Commercial National Section, N. E. L. A. Publication No. P-2, 20pp. (illustrated). Price, 50 cents; to members, 35 cents.

THIS is the second report of the "Marketing Electricity" series being published by the Commercial National Section. It calls attention to the vast possibilities of electric ventilation as a load builder and revenue producer for electric light and power companies. The report also is designed so as to be of service as a reference and guide in advising customers on the more simple types of installation.

The report is profusely illustrated and outlines a few of the many varied applications of electric ventilation to domestic, commercial and industrial users.—*E. S. B.*

Selling Wiring

Special Report, Wiring Sales Committee, Commercial National Section, N. E. L. A. Publication No. G-1, 24pp. (illustrated). Price, 50 cents; to members, 35 cents.

THIS report of the "Marketing Electricity" series deals with the work of the three divisions comprising the Wiring Sales Committee. On wiring promotion, a symposium is presented of the methods employed by a number of electric light and power companies toward promotion of adequate wiring. The plans followed by these various companies have been covered, such plans including the sales efforts, the financing scheme and advertising media. Brief reports on wiring materials and methods, and electrical code matters are included.—*E. S. B.*

Electrically Heated Stereotype Pots as Load Builders

Special Report, Industrial Heating Committee, Commercial and Industrial Power and Heating Bureau, Commercial National Section, N. E. L. A. Publication No. P-1, 16pp. (illustrated). Price, 40 cents; to members, 25 cents.

THIS is the first report of the "Marketing Electricity" series being published by the Commercial National Section. It discusses the application of electric heat to stereotype metal melting pots used by publishing companies, and the potential load. Statistics are presented showing that the public utility industry, by electrifying all the stereotype metal melting pots used by all newspapers of the country, could obtain an annual revenue of approximately $1,300,000. A load of such magnitude, with the desirable characteristics of unity power factor and high load factor, the report points out, is evidently of great value to electric light and power companies and should not be neglected.

A list is given of newspapers equipped with electric stereotype pots. Another table shows that plant demand is but slightly affected by electric stereotype pots. Operating data from representative large and small newspapers brings out the magnitude of the task which the heating equipment has to perform, and the relative economies of gas, oil and electrically heated stereotype pots.—*E. S. B.*

Construction and Maintenance Equipment and Methods

Report, Overhead Systems Committee, N. E. L. A. Publication No. 08, 20pp. (illustrated). Price, 40 cents; to members, 30 cents.

LABOR-SAVING devices, methods of construction and new equipment used for pole line construction and maintenance in the electric light and power industry are presented. A series of illustrations show more refinement in design for particular applications in truck work. The use of a narrow gage railway for construction of a tower line through swamp land and a blasting method of setting poles in boggy ground are described and illustrated.—*E. S. B.*

A Yardstick for Public Utility Costs

By William W. Handy, Consulting Engineer, Munsey Building, Baltimore, Maryland. Published by the Author. 155 pages. Illustrated with many charts and tables. Price $10.00.

THIS valuable reference book on the trend of costs of public utility construction and operation is the result of practical experience in the investigation of public utility properties covering the past two decades, and represents conclusions drawn from the detailed analyses of the operations of twenty representative gas and electric companies. The curves showing all the usual cost ratios and trends give maxima and minima and an overall average which provides what may quite properly be termed a public utility "yardstick" for the investigation of any particular electric light and power or gas property. It is expressly pointed out, however, that, as far as is now known, no comparable yardstick is possible for exclusively hydro-electric operations; a fact which is herewith commended to a considerable number of well-meaning gentlemen who advocate for this very purpose the establishment of water power plants under governmental auspices.

A feature of the book is the study covering trends in construction costs year by year since 1911. Except for a short peak in 1920 and a corresponding valley in 1921-1922, the figures show, in general, a gradual decline during the past ten years. They should make interesting reading to those who believe that the theory of "reproduction cost-new" will lead to an ultimate inflation of property values.—*W. M. C.*

$1,000 Prize for Advertising

(*Continued from page* 799)

fying from our standpoint and we feel that our customers and the sign industry have likewise received a proportional share of profit therefrom."

The Boston Edison Company's plan book, which ran to some 150 pages of amply illustrated material, gives the concrete picture of how a model campaign may be set up and executed by a large central station operating through an extensive territory. Divided into seven sections, the brochure discloses in its first section how the company organized to develop business. From there on, each section describes in detail, the beginnings and results of the annual sign show; how a continuous sign campaign is carried on and developed so as not to permit interest to flag; how electric shows may be transported to 26 outlying cities although the exhibits consist of elaborate sign displays; how sign schools are developed not only by a local central station, but with the cooperation of the N. E. L. A.; how to deal with reorganization of local sign groups who previously might have been under a loosely knit organization, etc.

The next award will be made in San Francisco in 1930 at the national convention of the N. E. L. A. Rules governing the award are as follows:

A. Only members of the National Electric Light Association are eligible to compete for the award.

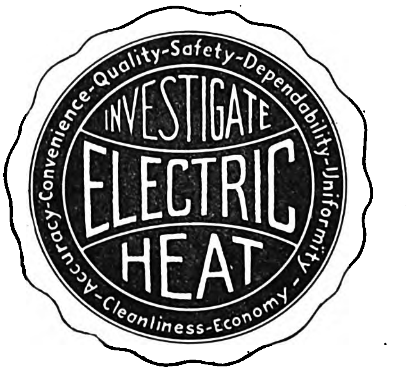
B. The contribution to the industry may be in the form of a new use for electrical advertising; or it may be in the form of an identification program for a company's various properties. It may be in the form of an enterprise whereby businesses throughout the country, or in a particular locality, are brought to a keener realization of the value of electrical advertising; or it may be in the form of an activity which makes possible better merchandising of electrical advertising. Briefly, then, any activity that contributes to the advancement of the electrical advertising industry is eligible for consideration.

C. The gold medal will be presented to the Company, while the $1,000 will be awarded to the individual in the Company who is directly responsible for the activity which made possible the winning of the award.

Conference of P. U. I. Group

(*Continued from page* 811)

H. S. Morse, B. J. Mullaney, Henry Obermeyer, J. R. Pershall, I. D. Pettegrew, Tom C. Polk, Stanley J. Quinn, J. S. S. Richardson, Thomas R. Shipp, Arthur W. Stace, Mrs. Ruth Phillips Steinhauser, William Stokes, Irving M. Tuteur, H. D. Valentine, W. S. Vivian, Frank Wert, Charles N. Wheeler, A. G. Whiddin, Labert St. Clair, S. Bowles, George F. Oxley.


Convenience-Quality-Safety-Dependability-Uniformity-Accuracy-Cleanliness-Economy
INVESTIGATE
ELECTRIC
HEAT

The slogan "Investigate Electric Heat" won first prize in the recent NEMA—N. E. L. A. slogan contest. It is expected that central stations and manufacturers of electric furnaces and allied products will use this design in advertising to the numerous industries employing electric heat.

OFFICERS—DIVISIONS—SECTIONS—BUREAUS—COMMITTEES—CONVENTIONS—MEETINGS—NEW MEMBERS

NATIONAL EXECUTIVE COMMITTEE

Officers

President, M. S. Sloan
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Cities Service Co., New York, N. Y.

Vice-President, J. F. Owens
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Treasurer, P. S. Young
Public Service Electric & Gas Co.,
Newark, N. J.

Managing Director, Paul S. Clapp
National Electric Light Association,
New York, N. Y.

Secretary, A. Jackson Marshall
National Electric Light Association,
New York, N. Y.

Members-at-Large

(*Terms expiring June 30th*, 1930)

P. S. Arkwright, *ex officio*, Georgia Power Co., Atlanta, Ga.

Charles W. Appleton, General Electric Co., New York, N. Y.

D. C. Barnes, Stone & Webster, Inc., Boston, Mass.

C. L. Collens, Reliance Electric & Manufacturing Co., Cleveland, Ohio

H. P. Liversidge, Philadelphia Electric Co., Philadelphia, Pa.

James R. Strong, Tucker Electrical Construction Co., New York, N. Y.

(*Terms expiring June 30th*, 1931)

John P. Coghlan, Pacific Gas & Electric Co., San Francisco, Cal.

F. A. Merrick, Westinghouse Electric & Manufacturing Co., New York, N. Y.

(*Terms expiring June 30th*, 1932)

G. E. Cullinan, Graybar Electric Co., Inc., New York, N. Y.

E. W. Lloyd, Commonwealth Edison Co., Chicago, Ill.

Harry Reid, National Electric Power Co., New York, N. Y.

National Section Chairmen

Accounting—W. R. Emerson, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

Commercial—Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

Engineering—A. D. Bailey, Commonwealth Edison Co., Chicago, Ill.

Public Relations—Harry Reid, National Electric Power Co., New York, N. Y.

Geographic Division residents

Canadian—P. S. Gregory, The Shawinigan Water & Power Co., Montreal, Canada

Eastern—John F. Ford, Philadelphia Electric Co., Philadelphia, Pa.

East Central—L. B. Herrington, Kentucky Utilities Co., Louisville, Ky.

Great Lakes—G. C. Neff, Wisconsin Power & Light Co., Madison, Wis.

Middle West—A. E. Bettis, Kansas City Power & Light Co., Kansas City, Mo.

New England—C. H. Hodskinson, The Edison Electric Illuminating Co., Boston, Mass.

North Central—Thomas T. Parker, Northwestern Public Service Co., Huron, S. D.

Northwest—M. L. Hibbard, Idaho Power Co., Boise. Idaho

Pacific Coast—E. B. Criddle, Southern Sierras Power Co., Riverside, Cal.

Rocky Mountain—W. D. Johnston, Mountain States Power Co., Casper, Wyo.

Southeastern—T. H. Tutwiler. Memphis Power & Light Co., Memphis, Tenn.

Southwestern—Fred W. Insull, Public Service Co. of Oklahoma, Tulsa, Okla.

PUBLIC POLICY COMMITTEE

Chairman, P. S. Arkwright, Georgia Power Co., Atlanta, Ga.

Vice-Chairman, C. E. Groesbeck, Electric Bond & Share Co., New York, N. Y.

R. H. Ballard, Southern California Edison Co., Los Angeles, Cal.

Henry G. Bradlee, Stone & Webster, Inc., Boston, Mass.

N. F. Brady, The New York Edison Co., New York, N. Y.

B. C. Cobb, Allied Power & Light Corp., New York, N. Y.

Frank L. Dame, The North America Co., New York, N. Y.

J. E. Davidson, Nebraska Power Co., Omaha, Neb.

Henry L. Doherty, Henry L. Doherty & Co., New York, N. Y.

Alex Dow, The Detroit Edison Co., Detroit, Mich.

Charles L. Edgar, The Edison Electric Illuminating Co., Boston, Mass.

Halford Erickson, Byllesby Engineering & Management Corp., Chicago, Ill.

W. W. Freeman, Columbia Gas & Electric Corp., New York, N. Y.

John F. Gilchrist, Commonwealth Edison Co., Chicago, Ill.

P. G. Gossler, Columbia Gas & Electric Corp., New York, N. Y.

A. R. Graustein, International Paper Co., New York, N. Y.

Franklin T. Griffith, Portland Electric Power Co., Portland, Ore.

Edwin Gruhl, The North American Co., New York, N. Y.

A. F. Hockenbeamer, Pacific Gas & Electric Co., San Francisco, Cal.

George H. Howard, The United Corp., New York, N. Y.

Martin J. Insull, Middle West Utilities Co., Chicago, Ill.

Samuel Insull, Commonwealth Edison Co., Chicago, Ill.

W. A. Jones, Cities Service Co., New York, N. Y.

Thomas W. Martin, Alabama Power Co., Birmingham, Ala.

Thomas N. McCarter, Public Service Electric & Gas Co., Newark, N. J.

John B. Miller, Southern California Edison Co., Los Angeles, Cal.

Sidney Z. Mitchell, Electric Bond & Share Co., New York, N. Y.

J. J. O'Brien, H. M. Byllesby & Co., Chicago, Ill.

J. F. Owens, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

R. F. Pack, Northern States Power Co., Minneapolis, Minn.

A. W. Robertson, Westinghouse Electric & Manufacturing Co., New York, N. Y.

Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

H. T. Sands, Electric Bond & Share Co., New York, N. Y.

Paul A. Schoellkopf, The Niagara Falls Power Co., Buffalo, N. Y.

M. S. Sloan, The New York Edison Co., New York, N. Y.

Frank W. Smith, The United Electric Light & Power Co., New York, N. Y.

R. P. Stevens, Allied Power & Light Corp., New York, N. Y.

Frank M. Tait, The Dayton Power & Light Co., Dayton, Ohio

George N. Tidd, American Gas & Electric Co., New York, N. Y.

Herbert A. Wagner, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

Owen D. Young, General Electric Co., New York, N. Y.

John E. Zimmermann, The United Gas Improvement Co., Philadelphia, Pa.

Public Relations National Section Representatives

D. C. Green, Electric Bond & Share Co., New York, N. Y.

T. A. Kenney, Allied Power & Light Corp., New York, N. Y.

Harry Reid, National Electric Power Co., New York, N. Y.

Guy W. Talbot, Pacific Power & Light Co., Portland, Ore.

GEOGRAPHIC DIVISIONS STATE ASSOCIATIONS

CANADIAN DIVISION

(*Entire Dominion of Canada*)

Canadian Electrical Association
President, P. S. Gregory, The Shawinigan Water & Power Co., Montreal, Can.; *Secretary*, H. M. Lyster, Room 405, Power Bldg., Montreal, Can.

(*This Division Has No State* [*Provincial*] *Section*)

*EASTERN DIVISION

(*New Jersey, New York, Pennsylvania*)

President, John F. Ford, Philadelphia Electric Co., Philadelphia, Pa.; *Managing Director*, A. B. Millar, Telegraph Bldg., Harrisburg, Pa.

Empire State Gas and Electric Association
President, William R. Welsh, New York & Richmond Gas Co., Stapleton, S. I., N. Y.; *Secretary*, Charles H. B. Chapin, 5618 Grand Central Terminal Bldg., New York, N. Y.

New Jersey Electric Association
President, C. H. Howell, Atlantic City Electric Co., Atlantic City, N. J.; *Secretary*, S. F. Delany, Atlantic City Electric Co., Atlantic City, N. J.

Pennsylvania Electric Association
President, John F. Ford, Philadelphia Electric Co., Philadelphia, Pa.; *Managing Director*, A. B. Millar, Telegraph Bldg., Harrisburg, Pa.

EAST CENTRAL DIVISION

(*Kentucky, Ohio, West Virginia*)

President, L. B. Herrington, Kentucky Utilities Co., Louisville, Ky.; *Secretary-Treasurer*, D. L. Gaskill, 603 Broadway, Greenville, Ohio.

Kentucky Association of Public Utilities
President, Samuel Riddle, Louisville Railway Co., Louisville, Ky.; *Secretary*, E. F. Kelley, Louisville Railway Co., Louisville, Ky.

Public Utilities Association of West Virginia
President, A. C. Spurr, Wheeling Traction Co., Wheeling, W. Va.; *Secretary*, A. Bliss McCrum, Box 1483, Charleston, W. Va.

GREAT LAKES DIVISION

(*Illinois, Indiana, Michigan, Wisconsin*)

President, G. C. Neff, Wisconsin Power & Light Co., Madison, Wis.; *Secretary*, Tom C. Polk, 26 North Wacker Drive, Chicago, Ill.

Illinois State Electric Association
President, E. F. Kelly, Central Illinois Public Service Co., Springfield, Ill.; *Secretary-Treasurer*, George W. Schwaner, 205 Illinois Mine Workers Bldg., Springfield, Ill.

Indiana Electric Light Association
President, C. V. Sorenson, Central Indiana Power Co., Indianapolis, Ind.; *Secretary-Treasurer*, William Stokes, 1548 Consolidated Bldg., Indianapolis, Ind.

Michigan Electric Light Association Section
President, E. L. Edward, Michigan Electric Power Co., Lapeer, Mich.; *Secretary-Treasurer*, Herbert Silvester, The Detroit Edison Co., Ann Arbor, Mich.

Wisconsin Utilities Association
President, G. W. Van Derzee, Milwaukee Electric Railway & Light Co., Milwaukee, Wis.; *Executive Secretary*, John N. Cadby, 502 Brumder Bldg., 105 Wells St., Milwaukee,, Wis.

*MIDDLE ATLANTIC DIVISION

(*To Consist of Delaware, District of Columbia, Maryland, Virginia*)

Maryland Utilities Association
President, H. T. Connolly, Washington, Baltimore & Annapolis Electric Railroad Company, Baltimore, Md.; *Secretary*, D. E. Kinnear, United Railways & Electric Company, Baltimore, Md.

Public Utilities Association of Virginia
President, A. W. Higgins, Virginia Public Service Co., Charlottesville, Va.; *Secretary*, A. B. Tunis, 301 East Grace Street, Richmond, Va.

MIDDLE WEST DIVISION

(Iowa, Kansas, Missouri, Nebraska)

President, A. E. Bettis, Kansas City Power & Light Co., Kansas City, Mo.; *Managing Director,* Thorne Browne, 1527 Sharp Bldg., Lincoln, Neb.

Iowa Section

President, C. S. Macy, Iowa Power & Light Co., Adel, Iowa; *Managing Director,* Joe Carmichael, 310 Crocker Bldg., Des Moines, Iowa.

Kansas Section

President, Frank M. Stone, Kansas Utilities Co., Fort Scott, Kan.; *Secretary,* H. Lee Jones, 820 Kansas Avenue, Topeka, Kan.

Missouri Association of Public Utilities

President, T. J. Strickler, Kansas City Gas Co., Kansas City, Mo.; *Secretary-Treasurer,* F. D. Beardslee, 315 North Twelfth Street, St. Louis, Mo.

Nebraska Section

President, C. W. Amidon, Central Power Co., Grand Island, Neb.; *Managing Director,* Thorne Browne, 1527 Sharp Bldg., Lincoln, Neb.

NEW ENGLAND DIVISION

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)

President, C. H. Hodskinson, The Edison Electric Illuminating Co., Boston, Mass.; *Secretary,* Miss O. A. Bursiel, Room 1113 Statler Bldg., 20 Providence Street, Boston, Mass.

(This Division Has No State Sections)

NORTH CENTRAL DIVISION

(Minnesota, North Dakota, South Dakota)

North Central Electric Association

President, Thomas T. Parker, Northwestern Public Service Co., Huron, S. D.; *Secretary,* John W. Lapham, 803-804 Plymouth Bldg., Minneapolis, Minn.

(This Division Has No State Sections)

NORTHWEST DIVISION

(Alaska, Idaho, Montana, Oregon, Utah. Washington)

Northwest Electric Light and Power Association

President, M. L. Hibbard, Idaho Power Co., Boise, Idaho; *Secretary,* Berkeley Snow, Room 1206, Spaulding Bldg., Portland, Ore.

(This Division Has No State Sections)

PACIFIC COAST DIVISION

(Arizona, California, Hawaii, Nevada, Philippine Islands)

Pacific Coast Electrical Association

President, E. B. Criddle, Southern Sierras Power Co., Riverside, Cal.; *Secretary,* Samuel H. Taylor, Suite 729-730, 447 Sutter Street, San Francisco, Cal.

Arizona Utilities Association

President, M. A. Pooler, Tucson Gas, Electric Light & Power Co., Tucson, Ariz.; *Secretary,* L. C. McCullough, 134 South Central Avenue, Phoenix, Ariz.

ROCKY MOUNTAIN DIVISION

(Colorado, New Mexico, Wyoming)

President, W. D. Johnston, Mountain States Power Co., Casper, Wyo.; *Secretary,* O. A. Weller, Public Service Co. of Colorado, Denver, Colo.

The Colorado Utilities Association

President, H. S. Robertson, Denver Tramway Corp., Denver, Colo.; *Secretary,* O. A. Weller, Public Service Co. of Colo., Denver, Colo.

New Mexico Utilities Association

President, W. W. Nielsen, New Mexico Power Co., Santa Fe, N. M.; *Secretary-Treasurer,* Bernard L. Wiles, Albuquerque Gas & Electric Co., Albuquerque, N. M.

Wyoming Utilities Association

President, W. D. Johnstone, Mountain States Power Co., Casper, Wyo.; *Secretary,* F. A. Probst, Mountain States Telephone & Telegraph Co., Casper, Wyo.

SOUTHEASTERN DIVISION

(Alabama, Cuba, Florida, Georgia, North Carolina, South Carolina, Tennessee, Porto Rico)

President, T. H. Tutwiler, Memphis Power & Light Co., Memphis, Tenn.; *Secretary,* C. M. Kilian, 207-8 Bona Allen Bldg., Atlanta, Ga.

SOUTHWESTERN DIVISION

(Arkansas, Louisiana, Mississippi, Oklahoma, Texas)

President, Fred W. Insull, Public Service Co. of Oklahoma, Tulsa, Okla.; *Secretary,* S. J. Ballinger, San Antonio Public Service Co., San Antonio, Tex.

Arkansas Utilities Association

President, W. E. Bann, Southwestern Gas & Electric Co., Texarkana, Tex.; *Secretary,* R. I. Brown, Arkansas Central Power Co., Little Rock, Ark.

Mississippi Electric League

President, A. H. Jones, Jones-Johnson Co., McComb, Miss.; *Secretary,* A. R. Riddick, A. G. Riddick, Inc., Jackson, Miss.

Oklahoma Utilities Association

President, Thomas R. Weymouth, Oklahoma Natural Gas Corp., Tulsa, Okla.; *Secretary,* Edward F. McKay, 1020 Petroleum Bldg., Oklahoma City, Oyla.

Southwestern Public Service Association

President, Knox Lee, Southwestern Gas & Electric Co., Marshall, Tex.; *Secretary,* E. N. Willis, 403 Slaughter Bldg., Dallas, Tex.

***Note: This Division is in Process of Formation.**

SECTIONS, BUREAUS AND COMMITTEES

Chairmen's names only listed here

SPECIAL NATIONAL COMMITTEES

Charles A. Coffin Prize Committee—M. S. Sloan, The New York Edison Co., New York, N. Y.

Codes and Standards Committee—Irvin W. Day, The Connecticut Light & Power Co., Waterbury, Conn.

Constitution and By-Laws Committee—R. F. Pack, Northern States Power Co., Minneapolis, Minn.

Electrification of Steam Railroads Committee—Britton I. Budd, Public Service Co. of Northern Illinois, Chicago, Ill.

Exhibition Committee—E. W. Goldschmidt, Wagner Electric Corp., New York, N. Y.

Finance Committee—Sidney Z. Mitchell, Electric Bond & Share Co., New York, N. Y.

Lamp Committee—Frank W. Smith, The United Electric Light & Power Co., New York, N. Y.

Prize Awards Committee—W. H. Onken, Jr., *Electrical World,* New York, N. Y.

Public Policy Committee—P. S. Arkwright, Georgia Power Co., Atlanta, Ga.

Rate Research Committee—L. R. Nash, Stone & Webster, Inc., Boston, Mass.

Water Power Development Committee—Paul A. Schoellkopf, The Niagara Falls Power Co., Buffalo, N. Y.

GENERAL NATIONAL COMMITTEES

***Civic Development Committee**—John B. Reynolds, Middle West Utilities Co., Chicago, Ill.

***Educational Committee**—Fred R. Jenkins, Commonwealth Edison Co., Chicago, Ill.

***Insurance Committee**—W. H. Sawyer, Stevens & Wood, Inc., New York, N. Y.

***Membership Committee**—A. Jackson Marshall, National Electric Light Association, New York, N. Y.

***Rural Electric Service Committee**—Eugene Holcomb, Consumers Power Co., Jackson, Mich.

ACCOUNTING NATIONAL SECTION

***Section's Executive Committee**—W. R. Emerson, Oklahoma Gas & Electric Co., Oklahoma City, Okla.

***Budget Committee**—B. F. Rodey, The United Electric Light & Power Co., New York, N. Y.

***Classification of Accounts Committee**—H. C. Hasbrouck, H. C. Hopson & Co., New York, N. Y.

***Customers' Records Committee**—E. W. Korsmeyer, Henry L. Doherty & Co., New York, N. Y.

Exhibit Committee—T. A. Wallace, Henry L. Doherty & Co., New York, N. Y.

***Fixed Capital Committee**—Thomas M. Ford, Philadelphia Electric Co., Philadelphia, Pa.

***General Records Committee**—C. E. McBride, Electric Bond & Share Co, New York, N. Y.

***Purchasing and Storeroom Committee**—K. C. Campbell, The Detroit Edison Co., Detroit, Mich.

***Statistics Committee**—Harry A. Snow, The Detroit Edison Co., Detroit, Mich.

COMMERCIAL NATIONAL SECTION

***Section's Executive Committee**—Marshall E. Sampsell, Central Illinois Public Service Co., Chicago, Ill.

***Commercial and Industrial Power and Heating Bureau**—V. M. F. Tallman, Charles H. Tenney & Co., Boston, Mass.

Commercial Cooking Committee—O. Wilhelmy, The Union Gas & Electric Co., Cincinnati, Ohio

General Power Committee—H. C. Thuerk, Associated Gas & Electric System, New York, N. Y.

Industrial Heating Committee—J. L. Faden, The Edison Electric Illuminating Co., Boston, Mass.

***Lighting Bureau**—M. E. Skinner, New York Power & Light Corp., Albany, N. Y.

Commercial and Industrial Lighting Committee W. H. Horton, Jr., West Penn Power Co., Pittsburgh, Pa.

Electrical Advertising Committee—C. J. Eaton, Middle West Utilities Co., Chicago, Ill.

Home Lighting Committee—W. T. Blackwell, Public Service Electric & Gas Co., Newark, N. J.

Street Lighting Committee—R. J. Malcomson, Public Service Co. of Northern Illinois, Chicago, Ill.

***Merchandising Bureau**—Frank D. Pembleton, Public Service Electric & Gas Co., Newark, N. J.

Domestic Electric Range Committee—Frank A. Coupal, Buffalo, Niagara & Eastern Power Corp., Buffalo, N. Y.

Merchandise Sales Committee—C. L. Harold, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

Refrigeration Committee—C. L. Dunn, The Ohio Public Service Co., Cleveland, Ohio.

Water Heating Committee—Norman T. Wilcox, Stone & Webster, Inc., Boston, Mass.

***Customer Relations Committee**—H. T. East, Public Service Co. of Northern Illinois, Chicago, Ill.

***Wiring Sales Committee**—A. P. Good, Commonwealth Edison Co., Chicago, Ill.

ENGINEERING NATIONAL SECTION

***Section's Executive Committee**—A. D. Bailey, Commonwealth Edison Co., Chicago, Ill.

***Accident Prevention Committee**—C. R. Beardsley, Brooklyn Edison Co., Inc., Brooklyn, N. Y.

***Electrical Apparatus Committee**—R. A. Hentz, Philadelphia Electric Co., Philadelphia, Pa.

Engineering Administration Committee—W. E. Mitchell, Georgia Power Co., Atlanta, Ga.

Engineering Research Committee—C. F. Hirshfeld, The Detroit Edison Co., Detroit, Mich.

***Hydraulic Power Committee**—Byron E. White, Utica Gas & Electric Co, Utica, N. Y.

***Inductive Coordination Committee**—H. L. Wills, Georgia Power Co, Atlanta, Ga.

***Meter Committee**—A. S. Albright, The Detroit Edison Co, Detroit, Mich.

***Overhead Systems Committee**—Sydney Alling, Rochester Gas & Electric Corp., Rochester, N. Y.

***Power System Engineering Committee**—L. W. W. Morrow, *Electrical World,* New York, N. Y.

***Prime Movers Committee**—R. D. DeWolf, Rochester Gas & Electric Corp., Rochester, N. Y.

***Underground Systems Committee**—G. C. McCabe, The Detroit Edison Co., Detroit, Mich.

PUBLIC RELATIONS NATIONAL SECTION

***Section's Executive Committee**—HARRY REID, National Electric Power Co., New York, N. Y.

***Cooperation with Educational Institutions**—JOHN F. GILCHRIST, Commonwealth Edison Co., Chicago, Ill.

***Cooperative Advertising and Publicity Committee**—JOHN P. COGHLAN, Pacific Gas & Electric Co., San Francisco, Cal.

***Customer Ownership**—W. H. HODGE, Byllesby Engineering & Management Corp., Chicago, Ill.

***Industrial Relations Committee**—HOMER E. NIESZ, Commonwealth Edison Co., Chicago, Ill.

Manufacturers' Advertising Committee—(To be determined.)

***Public Speaking Committee**—W. S. VIVIAN, Middle West Utilities Co., Chicago, Ill.

***Relations with Financial Institutions Committee**—CHARLES B. STUART, Halsey Stuart & Co., New York, N. Y.

***Women's Committee**—MISS SARA HARRIS, Utica Gas & Electric Co., Utica, N. Y.

***Provision is made for a representative from each Geographic Division.**

CONVENTIONS AND MEETINGS

Meeting of the Section, Bureaus and Committees of the National Electric Light Association are shown in roman type; those of other associations in italics

1929

December

2–4 Conference of Utility Association Secretaries, Drake Hotel, Chicago, Ill.

2–4 *American Institute of Electrical Engineers, Regional meeting, Chicago, Ill.*

2–6 *American Institute of Mechanical Engineers, Annual meeting, New York, N. Y.*

4–7 *American Society of Refrigerating Engineers, New York, N. Y.*

4–7 *The American Mining Congress, Mayflower Hotel, Washington, D. C.*

5–6 The Empire State Gas and Electric Association, Electric Section, Briarcliff, N. Y.

10–11 Commercial and Industrial Power and Heating Bureau, Commercial National Section, Westinghouse Lighting Institute, Grand Central Palace, New York, N. Y.

12 *New York Electrical Society, 29 West 39th Street, New York, N. Y.*

13 *Board of Directors, Society for Electrical Development, New York, N. Y.*

16 Accounting Section, Great Lakes Division, Palmer House, Chicago, Ill.

January

9–11 *American Engineering Council, Washington, D. C.*

13–14 Accident Prevention Committee, N. E. L. A. Headquarters, 420 Lexington Ave., New York, N. Y.

16–17 Lighting Bureau Committees, Hotel Schenley, Pittsburgh, Pa.

20–21 North Central Electric Association, Commercial Section, St. Paul Hotel, St. Paul, Minn. (Attendance by invitation only.)

20–22 Great Lakes Division, Commercial Section, Edgewater Beach Hotel, Chicago, Ill.

21–22 Underground Systems Committee, Washington, D. C.

23 Commercial National Section, Executive Committee, Edison Bldg., Chicago, Ill.

23–24 Overhead Systems Committee, Baltimore, Md.

24–25 Electrical Apparatus Committee, Commodore Hotel, New York, N. Y.

27–29 *American Society of Heating and Ventilating Engineers, Philadelphia, Pa.*

27–31 *American Institute of Electrical Engineers, New York, N. Y.*

27–31 *American Institute of Electrical Engineers, Santa Monica, Cal.*

27–31 *American Institute of Mining and Metallurgical Engineers, New York, N. Y.*

February

24–25 Accounting National Section Group Committee Meetings, Book Cadillac Hotel, Detroit, Mich.

24–25 North Central Electric Association, Engineering Section, Nicollet Hotel, Minneapolis, Minn.

24–25 Accounting National Section, Group Committee meetings, Book Cadillac Hotel, Detroit, Mich.

March

10–13 Engineering National Section, Group Committee Meetings, Edgewater Beach Hotel, Chicago, Ill.

11–13 Oklahoma Utilities Association, Tulsa, Okla.

April

5–9 *American Society of Mechanical Engineers, Washington, D. C.*

15–17 Southeastern Geographic Division, Bon Air-Vanderbilt Hotel, Augusta, Ga.

23–25 Middle West Division, Fort Des Moines Hotel, Des Moines, Iowa.

28–30 *Chamber of Commerce of U. S. A., Washington, D. C.*

May

1–2 *Chamber of Commerce of U. S. A., Washington, D. C.*

12–16 *National Fire Protection Association, Atlantic City, N. J.*

25–29 *Advertising Federation of America, Boston, Mass.*

June

9–12 *The American Society of Mechanical Engineers, Detroit, Mich.*

11–12 North Central Electric Association, Managerial, Alex Johnson Hotel, Rapid City, S. D.

16–20 NATIONAL ELECTRIC LIGHT ASSOCIATION, EXPOSITION AUDITORIUM, SAN FRANCISCO, CAL.

16–25 *World Power Conference, Berlin, Germany.*

21–26 *American Electric Railway Association, San Francisco, Cal.*

23–27 *American Institute of Electrical Engineers, Toronto, Can.*

September

25–27 Great Lakes Geographic Division, French Lick Springs, Ind.

NEW MEMBERS

Light and Power Companies, Employees of Light and Power Companies, Invited Persons, Manufacturing Companies, Employees of Manufacturing Companies, Associated Companies, Employees of Associated Companies and Foreign Organizations who have recently become Members of the National Electric Light Association.

NOTE: Names of new individual members are shown in the following order: First, in italics, post office address of company employing new members, and on the same line, in Roman letters, the name of the company employing new members; on succeeding indented lines, names of new members followed by post office address.

Electric Light and Power Companies (Class A)

Kansas, Abilene, The Central Kansas Power Company
Maine, Presque Isle, Maine Public Service Company

Employees of Electric Light and Power Companies (Class B)

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    Miss Clyda E. Weems
California, Los Angeles, Southern California Edison Company
    W. C. Curl
    J. F. Davenport
    Dwight P. Merrill (Redlands, Cal.)
    Harold Michener (Pasadena)
    Mrs. Jeanette I. Rees
    D. C. Tandy
California, San Diego, San Diego Consolidated Gas & Electric Company
    G. D. Brown
    William E. Frazer
    Roy E. Fritzer
    F. M. Sherrill
    F. A. Westrick
California, San Francisco, Pacific Gas & Electric Company
    W. R. Bowler (San Jose)
    J. B. Moorhead (Marysville)
Connecticut, Hartford, The Hartford Electric Light Company
    Miss Erna Fisher
Indiana, Indianapolis, Indiana Public Utilities Association
    H. E. Jordan
Maine, Portland, Cumberland County Power & Light Company
    Edwin T. Emerson
Massachusetts, Boston, The Edison Electric Illuminating Co. of Boston
    Miss Marjorie Howarth (Roslindale)
    Miss Clara A. Robinson
Massachusetts, Boston, New England Power Company
    Francis Lorenze Rimbach (Worcester)
Massachusetts, Boston, Charles H. Tenney & Company
    Eben B. Haskell
Massachusetts, Boston, The Twin States Gas & Electric Company
    Milton Harrison Worden
Massachusetts, Worcester, The Worcester Electric Light Company
    Earl C. Hart
Mississippi, Gulfport, Mississippi Power Company
    Dave Cottrell
Montana, Great Falls, Great Northern Utilities Company
    R. O. McPhillips (Shelby)
New Jersey, Newark, Public Service Electric & Gas Company
    Clyde D. Deitzler (Paterson)
    Albert J. Kahny (Princeton)
    Wilbur M. McFeely (Lansdowne, Pa.)
    Will McLain (Orange)
    John Schechel (Union City)
    Albert M. Wert (Princeton)
    Elmer E. Wyckoff, Jr. (East Orange)
New York, New York, American Gas & Electric Company
    H. O. Reinhardt
New York, New York, The New York Edison Company
    Lawrence Brieger
    David F. Bulson (Jackson Heights, L. I.)
    John A. Devitto
    Franklin L. Harris (Bayside)
    William J. Healy
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    Edwin A. Mellin
    C. Moyle Mosher (Brooklyn, N. Y.)
    Nicholas F. Ritter
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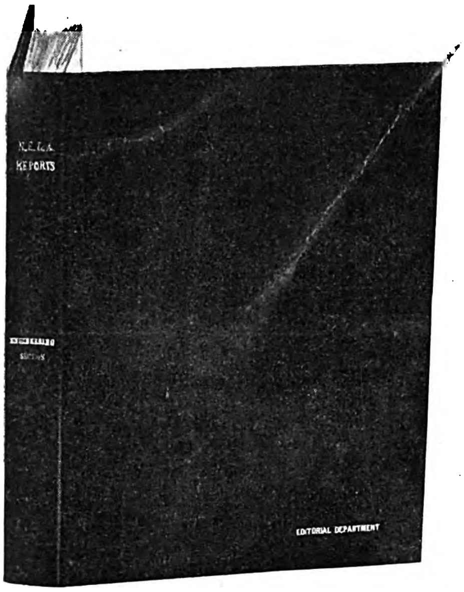
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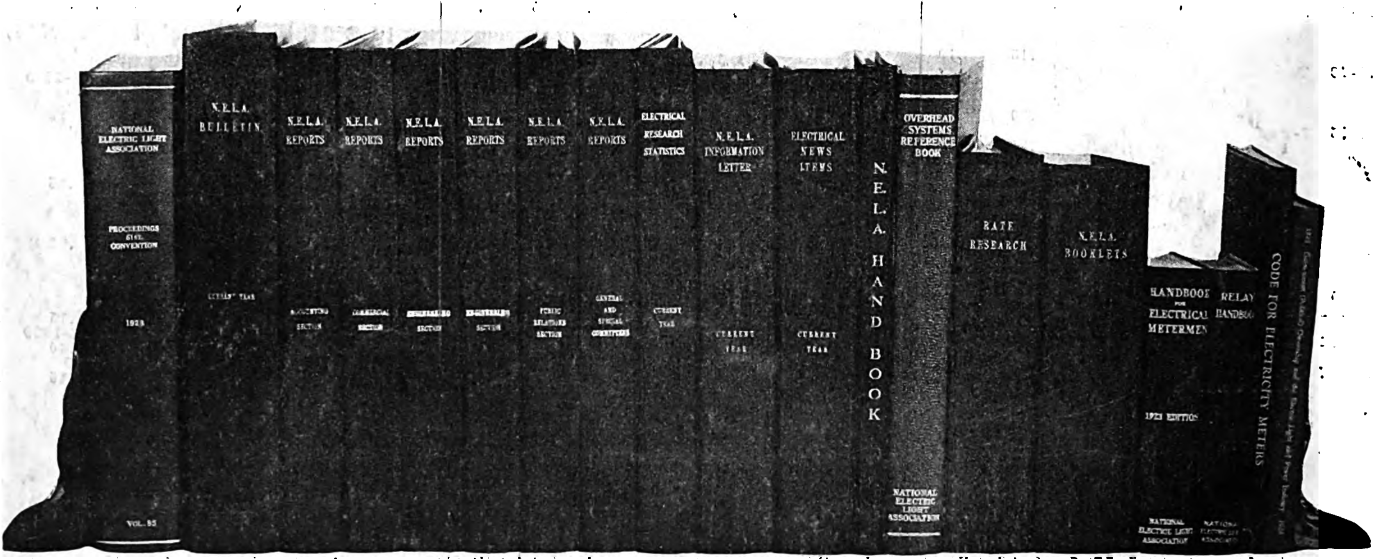
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